F.Y.B.Tech Mechanical

SEM-I Syllabus

AY 2023-24

(DAC. UGP)

Walchand College of Engineering, Sangli

(Government Aided Autonomous Institute)

AY 2023-24

Course Information	
Programme	B.Tech. (All Branches)
Class, Semester	First Year B. Tech., Sem I
Course Code	7MA101
Course Name	Engineering Mathematics- I
Desired Requisites:	Mathematics course at Higher Secondary Junior College

Teaching Scheme		**Examination Scheme (Marks)**			
Lecture	3 Hrs/week	**MSE**	**ISE**	**ESE**	**Total**
Tutorial	1 Hrs/week	30	20	50	100
		Credits: 04			

Course Objectives	
1	Introduce the basic concepts required to understand, construct, solve and interpret various types of differential equation.
2	Improve the Mathematical skill for enhancing logical thinking power of students
3	Acquire knowledge with a sound foundation in Mathematics and prepare them for graduate.
4	

Course Outcomes (CO) with Bloom's Taxonomy Level		
At the end of the course, the students will be able to,		
CO1	Explain mathematical concepts in engineering field.	Understanding
CO2	Solve engineering and scientific problems.	Applying
CO3	Applying the Mathematical concept in Engineering field	Applying
CO4		

Module	**Module Contents**	**Hours**
I	**Matrices** Rank of matrix, Homogeneous and non-homogeneous linear equations, Eigen values, Eigen vectors, Cayley Hamilton theorem, Diagonalizations of matrices.	**6**
II	**Partial Differentiation and its application** Partial derivative, chain rule for partial differentiation, Euler's theorem for homogeneous and non-homogeneous function, Jacobian, Error and approximation, maxima and minima of function of two variables	**8**
III	**Complex Number**Polar form of complex number, Argand's diagram, De Moiver's theorem, roots of complex number, Hyperbolic function, relation between circular and hyperbolic function.	**7**

IV	**First order ordinary differential equation and its application** Exact, Linear, Bernoulli's equations, Euler's equations, Orthogonal trajectory, applications to simple electric circuit.	**7**
V	**Numerical Solution of Ordinary Differential Equations of first order and first degree:** Numerical Solution by (i) Taylor's series method (ii) Euler's method (iii) Modified Euler's method (iv) Runge- Kutta fourth order method	**6**
VI	**Calculus** Rolle's theorem, Mean value theorem, Taylor's and Maclaurin's theorem with remainders	**5**

Textbooks	
1	P. N. and J. N. Wartikar "A Text Book of Applied Mathematics, Vol I and II, Vidyarthi Griha Prakashan, Pune, 2006.
2	B .S. Grewal "Higher Engineering Mathematics", , Khanna Publication, 44th Edition, 2017.
3	
4	

References	
1	Erwin Kreyszig , "Advanced Engineering Mathematics", , Wiley Eastern Limited Publication, 10th Edition, 2015.
2	Wylie C.R *"Advanced Engineering Mathematics",*., Tata McGraw Hill Publication, 8th Edition 1999.
3	H. K. Dass, "*Advanced Engineering Mathematics",* S. Chand & Company Ltd., 1st Edition, 2014.
4	B.V.Ramana, "Higher Engineering Mathematics ", The McGraw Hill companies, 2006.

Useful Links	
1	https://nptel.ac.in/courses/111105121
2	
3	
4	

CO-PO Mapping														
	Programme Outcomes (PO)												**PSO**	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	2			1										
CO2	2			1										
CO3	2			1										
CO4														

The strength of mapping is to be written as 1: Low, 2: Medium, 3: High
Each CO of the course must map to at least one PO.

Assessment

The assessment is based on MSE, ISE and ESE.
MSE shall be typically on modules 1 to 3.
ISE shall be taken throughout the semester in the form of teacher's assessment. Mode of assessment can be field visit, assignments etc. and is expected to map at least one higher order PO.
ESE shall be on all modules with around 40% weightage on modules 1 to 3 and 60% weightage on modules 4 to 6.
For passing a theory course, Min. 40% marks in (MSE+ISE+ESE) are needed and Min. 40% marks in ESE are needed. (ESE shall be a separate head of passing)

Walchand College of Engineering, Sangli
(Government Aided Autonomous Institute)

AY 2023-24

Course Information

Programme	B.Tech. (Civil & Mechanical Engineering)
Class, Semester	First Year B. Tech. I & II
Course Code	7ME107
Course Name	Engineering Graphics
Desired Requisites:	Basic Knowledge of Different Types of Curves

Teaching Scheme		**Examination Scheme (Marks)**			
Lecture	2Hrs/week	**MSE**	**ISE**	**ESE**	**Total**
Tutorial	-	30	20	50	100
		Credits: 2			

Course Objectives

1	Introduce students to the conventions, concepts and basic principles of Engineering Drawing.
2	Draw projections of geometrical objects and real life components.
3	Demonstrate graphics skill for communication of concepts, ideas and design of engineering products

Course Outcomes (CO) with Bloom's Taxonomy Level

At the end of the course, the students will be able to,

CO	**Course Outcome Statement/s**	**Bloom's Taxonomy Level**	**Bloom's Taxonomy Description**
CO1	Demonstrating Principles of Engineering, Computer Graphics through drafting software	I	Demonstrating
CO2	Understanding Principles of Engineering Graphics	II	Understanding
CO3	Outline projection of engineering objects	II	Understanding

Module	**Module Contents**	**Hours**
I	**Introduction to Engineering Drawing / Curves** Principles of Engineering Graphics and their significance, usage of Drawing instruments, lettering, Conic sections including the Rectangular Hyperbola (General method only); Cycloid, Epicycloid, Hypocycloid and Involute; Scales – Plain, Diagonal and Vernier Scales;	4
II	**Projection of Lines** Principles of Orthographic Projections-Conventions - Projections of Points and lines inclined to both planes, Skew Lines, Parallel Lines, Perpendicular Lines using auxiliary methods;	5
III	**Projection of Planes** Principles of Orthographic Projections-Conventions - Projections of planes inclined Planes - Auxiliary Planes;	4
IV	**Projections of Regular Solids Sections and Sectional Views of Right Angular Solids** Inclined to both the Planes- Auxiliary Views; Draw simple annotation, dimensioning and scale. Floor plans that include: windows, doors, and fixtures such as WC, bath, sink, shower, etc. Prism, Cylinder, Pyramid, Cone – Auxiliary Views; Development of surfaces of Right Regular Solids - Prism, Pyramid, Cylinder and Cone;	5
V	**Orthographic Projections** Principles of Orthographic Projections-Conventions - Draw the sectional orthographic views of geometrical solids, objects from industry and dwellings (foundation to slab only)	4

VI	**Isometric Projections** Principles of Isometric projection – Isometric Scale, Isometric Views, Conventions; Isometric Views of lines, Planes, Simple and compound Solids; Conversion of Isometric Views to Orthographic Views and Vice-versa, Conventions;	4

Module wise Measurable Students Learning Outcomes :

After the completion of the course the student should be able to:

The student will learn :

- Introduction to engineering drawing and its place in society
- Exposure to the visual aspects of engineering design
- Exposure to engineering graphics projection of standard solid primitives
- Exposure to visualization of 3-D solid modeling
- Exposure to computer-aided geometric drafting
- Exposure to creating working drawings

Text Books	
1	Bhatt N.D., Panchal V.M. and Ingle P.R., Engineering Drawing, Charotar Publishing House, 2014.
2	Shah, M.B. and Rana B.C., Engineering Drawing and Computer Graphics, Pearson Education, 2008.
3	Agrawal B. and Agrawal C. M., Engineering Graphics, TMH Publication, 2012.
References	
1	Narayana, K.L. and P Kannaiah, Text book on Engineering Drawing, Scitech Publishers, 2008.
2	Warren J. Luzzader, Fundamentals of Engineering Drawing, Prentice Hall of India, New Delhi, 2010
3	Fredderock E. Giesecke, Alva Mitchell others, Principles of Engineering Graphics, Maxwell McMillan Publishing, 2010
Useful Links	
1	https://nptel.ac.in/courses/112/103/112103019/
2	https://nptel.ac.in/courses/105/104/105104148/
3	https://www.youtube.com/watch?v=xXdpkQXDuMw&list=PL9RcWoqXmzaJT-fliqTSwUjWU4zCX_H2A

CO-PO Mapping For Mechanical Engineering Department

	Programme Outcomes (PO)												**PSO**		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	
CO1	3				2					1		1	2		
CO2			2												
CO3					3					1					

The strength of mapping is to be written as 1,2,3; Where, 1:Low, 2:Medium, 3:High

CO-PO Mapping For Civil Engineering Department

	Programme Outcomes (PO)												**PSO**		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	
CO1	3		3		3					1		1			
CO2			2												
CO3					3					1					

The strength of mapping is to be written as 1,2,3; Where, 1:Low, 2:Medium, 3:High

Assessment

The assessment is based on MSE, ISE and ESE.

MSE shall be typically on modules 1 to 3.

ISE shall be taken throughout the semester in the form of teacher's assessment. Mode of assessment can be field visit, assignments etc. and is expected to map at least one higher order PO.

ESE shall be on all modules with around 40% weightage on modules 1 to 3 and 60% weightage on modules 4 to 6.
For passing a theory course, Min. 40% marks in (MSE+ISE+ESE) are needed and Min. 40% marks in ESE are needed. (ESE shall be a separate head of passing)

Walchand College of Engineering, Sangli

(Government Aided Autonomous Institute)

AY 2023-24

Course Information	
Programme	B. Tech. (Mechanical, Civil, CSE,IT)
Class, Semester	First Year B. Tech. Sem. I/II
Course Code	7EE106
Course Name	Electrical & Electronics Engineering
Desired Requisites:	12th Physics

Teaching Scheme		**Examination Scheme (Marks)**			
Lecture	3 Hrs/week	**MSE**	**ISE**	**ESE**	**Total**
Tutorial	-	30	20	50	100
		Credits: 3			

Course Objectives	
1	This course intends to summarize and solve electrical and magnetic circuits.
2	It imparts skill to identifying principles, construction and working of electrical machines.
3	To **explain** the difference between analog and digital electronic circuits.
4	To **explain** the working of diode circuits, transistorized and op-amp based amplifiers.

Course Outcomes (CO) with Bloom's Taxonomy Level

At the end of the course, the students will be able to,

CO	**Course Outcome Statement/s**	**Bloom's Taxonomy Level**	**Bloom's Taxonomy Description**
CO1	**Explain** principles, construction and working of electrical machines.	II	Understanding
CO2	**Solve** electrical and magnetic circuits.	III	Applying
CO3	**Explain** the fundamentals of digital electronics.	I	Understanding
CO4	**Solve** the examples on digital circuits, diodes and transistors and Op-amp based circuits.	III	Applying

Module	**Module Contents**	**Hours**
I	**Module 1: DC Circuits** Review of R-L-C- Electrical circuit elements, KCL and KVL. Star- delta conversion, voltage and current sources. Thevenin, Norton and Superposition, Maximum powers transfer Theorems	6
II	**Module 2: AC Circuits** Representation of sinusoidal waveforms, peak, RMS values, phasor representation real, reactive and apparent power. Analysis of single-phase, ac circuits consisting of R, L, C, RL, RC, RLC (series and parallel) circuits and three-phase balanced circuits. Voltage and current relations in star and delta.	6
III	**Module 3: Electrical Machines** Construction, working principle and types of DC generator and Motor. Speed-Torque characteristics. Construction and working principle of single and three- phase induction motor. Types, torque- speed characteristics Magnetic circuits, Construction, working principle of single-phase transformer, and types.	6

IV	**Module 4: Fundamentals of Digital Electronics** Boolean algebra, SOP and POS terms, K-map reduction technique, converting AOI to NAND/NOR logic. Combinational Circuits: half adder and subtractor, 1-bit full adder and subtractor, 1-bit and 2-bit comparator, Sequential Circuits: flip-flop, counters.	6
V	**Module 5: Diodes and Transistors** P-N junction diode, diode characteristics, half-wave and full-wave rectifier, clippers and clampers; Zener diode, LED, Photodiode and Solar Cell. Introduction to sensors: Light and Temperature Sensors. Transistor structure, types (BJT, FET and MOSFET), biasing methods, transistor as a switch.	
VI	**Module 6: Operational Amplifier** Basic op-amp configuration, op-amp powering, feedback in op-amp circuits, ideal op-amp circuits analysis, inverting, non-inverting amplifier, summing amplifier, difference amplifier, unity gain buffer; IC555 timer.	6

Textbooks	
1	D.C. Kulshreshtha, "Basic Electrical Engineering", 1st revised edition McGraw Hill, 2012.
2	D.P Kothari and I.J Nagrath, "*Basic Electrical Engineering",* Tata McGraw Hill, 2010.
3	B.L Theraja "A Textbook of Electrical Technology", S Chand Publication, 2013.
4	R. P. Jain, "Modern Digital Electronics", 4th edition, Tata McGraw Hill, 2009.
5	Robert Boylestad, Louis Nashelsky, 11th edition, "Electronic Devices and Circuits, Pearson, 2015.
6	Ramakant Gaikwad, "Op-amp and Linear Integrated Circuits", 4th edition, Pearson, 2015.
References	
1	V. D. Toro, "Electrical Engineering Fundamentals", Prentice Hall India, 1989.
2	E. Hughes, "Electrical and Electronics Technology", Pearson, 2010.
3	V. N. Mittle and Arvind Mittal, "Basic Electrical Engineering", 2nd edition, Tata McGraw Hill.
4	Morris Mano, "Digital Design", Pearson, 4th edition, 2011
5	Donald A. Neamen, "Electronic Circuit Analysis and Design", 3rd edition, Tata McGraw Hill, 2011
6	Robert F. Coughlin and Frederick F. Driscoll, "Operational Amplifiers and Linear Integrated Circuits", 6th edition, PHI, 2009
Useful Links	
1	Basic Electrical Technology, IISc Bangalore, by Prof. L. Umanand, "https://nptel.ac.in/courses/108108076"
2	Basic Electrical Technology, IIT Kharagpur, by Prof. N.K. De, Prof. G.D. Roy, Prof. T.K. Bhattacharya, "https://nptel.ac.in/courses/108105053"
3	Fundamentals of Electrical Engineering, IIT Kharagpur,by Prof. Debapriya Das , "https://nptel.ac.in/courses/108105112"
4	https://nptel.ac.in/courses/108101091
5	https://nptel.ac.in/courses/108105113

CO-PO Mapping

	Programme Outcomes (PO)												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	3													
CO2		3												
CO3	2	2												
CO4	2	2												

The strength of mapping is to be written as 1: Low, 2: Medium, 3: High
Each CO of the course must map to at least one PO.

Assessment
The assessment is based on MSE, ISE and ESE. MSE shall be typically on Three modules. (One and half modules from Electrical syllabus and one and half modules from Electronics syllabus) ISE shall be taken throughout the semester in the form of teacher's assessment. Mode of assessment can be field visit, assignments etc. and is expected to map at least one higher order PO. ESE shall be on all modules with around 40% weightage on modules up to MSE and 60% weightage on modules after MSE. For passing a theory course, Min. 40% marks in (MSE+ISE+ESE) are needed and Min. 40% marks in ESE are needed. (ESE shall be a separate head of passing)

Walchand College of Engineering, Sangli
(Government Aided Autonomous Institute)

AY 2023-24

Course Information

Programme	B.Tech. (Mechanical Engineering)
Class, Semester	First Year B. Tech. SEM-I
Course Code	7ME101
Course Name	Elements of Mechanical Engineering
Desired Requisites:	NA

Teaching Scheme		**Examination Scheme (Marks)**			
Lecture	3Hrs/week	**MSE**	**ISE**	**ESE**	**Total**
Tutorial	-	30	20	50	100
		Credits: 3			

Course Objectives

1	To engage students in analysing mechanisms used in Mechanical Engineering
2	To prepare the students for applying concepts of motion transmission using mechanisms and gears

Course Outcomes (CO) with Bloom's Taxonomy Level

At the end of the course, the students will be able to,

CO	**Course Outcome Statement/s**	**Bloom's Taxonomy Level**	**Bloom's Taxonomy Description**
CO1	Understand the basic principle of mechanisms and stress	II	Understanding
CO2	Identify and classify gears based on their application	III	Applying
CO3	Describe the thermodynamic systems: power producing absorbing devices	II	Understanding

Module	**Module Contents**	**Hours**
I	**Conventional and nonconventional power plants** Steam power plants, hydropower plant, four stroke and two stroke petrol and diesel engines Diesel power plant, wind power plants	7
II	**Study of mechanical systems** pumps, compressors, refrigeration, and air conditioning system, hydraulic and pneumatic systems.	6
III	**Basic thermodynamics** First and second law of thermodynamics. Gas processes, Cannot cycle, Otto cycle, Joule cycle, Air standard efficiency, numerical on above	7
IV	**Basics of Machines and Mechanisms** Objective of kinematic analysis of mechanism, classification of links, pairs, Basic terminology and kinematic symbols, kinematic chains, plane motion; constraints and degrees of freedom, mechanism and machines, inversion of mechanisms along with their practical applications.	7
V	**Elements of Power Transmission - I** Gears: Classification and Basic terminology, Fundamental law of gearing, the cycloidal and involute profile, standards in tooth forms, spur gears and other types of gears	6
VI	**Elements of Power Transmission – II** Introduction to belt and chain drives, types of belt drives, shafts, keys, couplings, sliding and rolling contact bearings	6

Text Books

1	Beer and Johnson, Mechanics of Materials, McGraw Hill, 6th Edition , 2013
2	S S Rattan, Theory of Machines, McGraw Hill, 3rd edition, 2016

3	R,Yadav, Applied Thermodynamics, Central Publishing House, 3rd Edition, 2011
References	
1	Den Hartog, Jacob P., Strength of Materials. Dover Publications Inc., 3rd Edidtion 1961
2	Yunus A Cengel and Michael Boles, Thermodynamics:An engineering approach, McGraw Hill, 9th Edition, 2015
Useful Links	
1	https://archive.nptel.ac.in/courses/112/104/112104188/
2	https://www.youtube.com/watch?v=kC2SEiGaqoA
3	https://nptel.ac.in/courses/112104304

CO-PO Mapping For Mechanical Engineering Department															
	Programme Outcomes (PO)												**PSO**		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	
CO1	1		2		2			3			1				
CO2	1	3	2				2								
CO3															
The strength of mapping is to be written as 1,2,3; Where, 1:Low, 2:Medium, 3:High															

Assessment
The assessment is based on MSE, ISE and ESE. MSE shall be typically on modules 1 to 3. ISE shall be taken throughout the semester in the form of teacher's assessment. Mode of assessment can be field visit, assignments etc. and is expected to map at least one higher order PO. ESE shall be on all modules with around 40% weightage on modules 1 to 3 and 60% weightage on modules 4 to 6. For passing a theory course, Min. 40% marks in (MSE+ISE+ESE) are needed and Min. 40% marks in ESE are needed. (ESE shall be a separate head of passing)

Walchand College of Engineering, Sangli

(Government Aided Autonomous Institute)

AY 2023-24

Course Information

Programme	B.Tech.
Class, Semester	First Year B. Tech. Sem I/II
Course Code	7CH155
Course Name	Engineering Chemistry Lab
Desired Requisites:	Chemistry course at secondary and higher secondary level

Teaching Scheme		**Examination Scheme (Marks)**			
Practical	2Hrs/ Week	**LA1**	**LA2**	**Lab ESE**	**Total**
Interaction	0Hrs/ Week	30	30	40	100
		Credits: 1			

Course Objectives

1	To make the student familiar with analytical techniques.
2	To provide hands on practice of Instrumental and titrimetric analysis.

Course Outcomes (CO) with Bloom's Taxonomy Level

At the end of the course, the students will be able to,

CO	**Course Outcome Statement/s**	**Bloom's Taxonomy Level**	**Bloom's Taxonomy Description**
CO1	Apply principles of Volumetry/gravimetry to quantitative analysis for water quality parameter, metal and alloys.	III	Applying
CO2	Demonstrate use of instrument for quantitative analysis.	III	Applying
CO3	Experiment physical/Chemical characteristics of material. Execute preparation of product.	III	Applying

List of Experiments (Minimum 8 experiments from the following list)

Sr. No	**List of Experiments**	**Hours**
1	Estimation of hardness of water by EDTA method (Complexometric Titration).	2 Hrs. each Expt.
2	Estimation of alkalinity of water (Neutralization Titration).	
3	Estimation of Dissolved Oxygen in water (Iodometric Titration).	
4	Estimation of Chloride content in water (Argentometry).	
5	Demonstration of pH meter & pH metric titration.	
6	Determination of strength of acid/base by conductometrically.	
7	Colorimetric estimation of Copper.	
8	Estimation of copper from Bronze. (Iodometric Titration).	
9	Estimation of Zn from Brass (Displacement Titration).	
10	Determination of purity of Iron (Redox Titration).	
11	Determination of viscosity of given liquid. by Ostwald viscometer.	
12	Determination of corrosion rate by weight loss method	
13	Gravimetric estimation of Ba from $BaSO_4$ as BaO.	
14	Preparation of Resin	
List of Topics(Applicable mode):		
	Verification of Calcium content from Cement/ Limestone/Eggs shells/Calcium tablet.	

Dr. Doddas Rao A. A. Powar

Textbooks	
1	College Practical Chemistry, V K Ahaluwaliya. Sunita Dhingra, Adarsha Gulati , Universities Press.
2	Laboratory Manual on Engineering Chemistry by Sudha Rani And S.K. Bashin, Dhanpat Rai& Co.

References	
1	Engineering Chemistry Laboratory Manual, Department of Chemistry WCE, Sangli.
2	J Mendham, R.C. Denney, J.D. Barnes, M.J.K Thomas, "Quantitative Chemical analysis", Vogels, Pearson Education, 2008, 6th Edition.

Useful Links	
1	https://www.lccc.edu/academics/science-and-engineering/science-in-motion/labs-equipment/chemistry-lab-experiments
2	https://edu.rsc.org/resources/collections/classic-chemistry-experiments

CO-PO Mapping

	Programme Outcomes (PO)												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	3													
CO2	3													
CO3	3													

The strength of mapping is to be written as 1,2,3; where, 1: Low, 2: Medium, 3: High
Each CO of the course must map to at least one PO, and preferably to only one PO.

Assessment

There are three components of lab assessment, LA1, LA2 and Lab ESE.
IMP: Lab ESE is a separate head of passing.(min 40 %),LA1+LA2 should be min 40%

Assessment	Based on	Conducted by	Typical Schedule	Marks
LA1	Lab activities, attendance, journal	Lab Course Faculty	During Week 1 to Week 8 Marks Submission at the end of Week 8	30
LA2	Lab activities, attendance, journal	Lab Course Faculty	During Week 9 to Week 16 Marks Submission at the end of Week 16	30
Lab ESE	Lab activities, journal/ performance	Lab Course Faculty	During Week 18 to Week 19 Marks Submission at the end of Week 19	40

Week 1 indicates starting week of a semester. Lab activities/Lab performance shall include performing experiments, as per the nature and requirement of the lab course. The experimental lab shall have typically 8-10 experiments and related activities if any.

Walchand College of Engineering, Sangli

(Government Aided Autonomous Institute)

AY 2023-24

Course Information

Programme	B.Tech.
Class | Semester	First Year B. Tech (Mechanical Engineering) | Semester I
Course Code	7CS106
Course Name	Computer Programming (Python Programming)
Desired Requisites:	

Teaching Scheme		**Examination Scheme (Marks)**			
Practical	2 Hrs/ Week	**LA1**	**LA2**	**Lab ESE**	**Total**
Interaction	1 Hrs/ Week	30	30	40	100
		Credits: 2			

Course Objectives

1	To understand problem solving and problem solving aspects.
2	To learn basics, features and future of Python programming.
3	To acquaint with data types, input output statements, decision making, looping, functions, array, string, pointer, structure and union in Python.

Course Outcomes (CO) with Bloom's Taxonomy Level

At the end of the course, the students will be able to,

CO	**Course Outcome Statement/s**	**Bloom's Taxonomy Level**	**Bloom's Taxonomy Description**
CO1	Inculcate the various skills in Problem Solving.	II	Understand
CO2	Demonstrate significant experience with the Python Programming.	III	Applying
CO3	To test and execute the Python programs and correct syntax and logical errors.	IV	Analyse

List of Experiments / Lab Activities/Topics

List of Topics (Applicable for Interaction Mode):

Module I: Basics of Problem Solving: General Problem Solving Concepts, Types of Problems, Problem Solving Strategies. **Program Design Tools:** Algorithms, Flowcharts and Pseudo-Codes.

Module II: Python Programming: Writing and Executing Python Program, Variables, Keywords, Identifiers, Constants, Operators & Expressions, Operators, Data Types.

Module III: Decision Control Statements: Conditional Statements: If, If-else, Nested If, If-elseif Statements. **Iterative Statements:** While Loop, For Loop, Do While Loop, Break, Continue, Pass.

Module IV: Functions: Need, Definition, Call, Variable Scope, Return Statement, Lambda or Anonymous Function. **Modules:** Definition, Introduction to packages in Python, Introduction to standard library modules.

Module V: Strings and Operations: Concatenation, Appending, Multiplication and Slicing. Strings are Immutable, Strings Formatting Operator.

Module VI: File Handling: Introduction, File path, Types of files, Opening and Closing files, Reading and Writing files.

List of Experiments:

1. Program to simulate simple calculator that performs basic tasks such as addition, subtraction, multiplication and division.
2. Program to demonstrate different operators and their order precedence.
3. Program to accept the number and Compute a) Square root of number, b) Square of number, c) Cube of number d) Check for prime, d) factorial of number,
4. Program to accept a number from user and print digits of number in a reverse order.
5. Program to accept two numbers from user and compute smallest divisor and Greatest Common Divisor of these two numbers.
6. Program to find whether the number is positive / negative / zero using conditional statement.
7. Programs to show different types of iteration / loop.
8. Program to accept N numbers from user and compute and display maximum in list, minimum in list, sum and average of numbers.
9. Program to print the Fibonacci Series (with & without recursion).
10. Program to swap two number using function.
11. Program to accepts a string from user and perform following string operations, a) Calculate length of string, b) String reversal, c) Check palindrome,
12. Program to demonstrate different file handling functions.
13. Program to copy contents of one file to other.

Textbooks	
1	Reema Thareja, "Python Programming Using Problem Solving Approach", Oxford University Press, ISBN 13: 978-0-19-948017-6.
2	R. Nageswara Rao, "Core Python Programming", Dreamtech Press; Second edition ISBN10: 938605230X, ISBN-13: 978-9386052308 ASIN: B07BFSR3LL.
References	
1	Maureen Spankle, "Problem Solving and Programming Concepts", Pearson; 9th edition, ISBN-10: 9780132492645, ISBN-13: 978-0132492645.
2	Romano Fabrizio, "Learning Python", Packt Publishing Limited, ISBN: 9781783551712, 1783551712.
3	Martin C. Brown, "Python: The Complete Reference", McGraw Hill Education, ISBN-10: 9789387572942, ISBN-13: 978-9387572942, ASIN: 9387572943.
4	Jeeva Jose, P. Sojan Lal, "Introduction to Computing & Problem Solving with Python", Khanna Computer Book Store; First edition, ISBN-10: 9789382609810, ISBN-13: 978-9382609810
Useful Links	
1	https://www.w3schools.com/python/
2	https://www.geeksforgeeks.org/python-programming-language/

CO-PO Mapping

	Programme Outcomes (PO)												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	3	2												
CO2	1		2		2									
CO3		2	1	2										

The strength of mapping is to be written as 1,2,3; where, 1: Low, 2: Medium, 3: High
Each CO of the course must map to at least one PO, and preferably to only one PO.

Assessment

There are three components of lab assessment, LA1, LA2 and Lab ESE.
IMP: Lab ESE is a separate head of passing.(min 40 %), LA1+LA2 should be min 40%

Assessment	Based on	Conducted by	Typical Schedule	Marks

LA1	Lab activities, attendance, Submission	Lab Course Faculty	During Week 1 to Week 8 Marks Submission at the end of Week 8	30
LA2	Lab activities, attendance, Submission	Lab Course Faculty	During Week 9 to Week 16 Marks Submission at the end of Week 16	30
Lab ESE	Lab activities/ submission/ performance	Lab Course Faculty and External Examiner as applicable	During Week 18 to Week 19 Marks Submission at the end of Week 19	40
Week 1 indicates starting week of a semester. Lab activities/Lab performance shall include performing experiments, mini-project, presentations, drawings, programming, and other suitable activities, as per the nature and requirement of the lab course. The experimental lab shall have typically 8-10 experiments and related activities if any.				

Walchand College of Engineering, Sangli

(Government Aided Autonomous Institute)

AY 2023-24

Course Information

Programme	B.Tech. (Civil & Mechanical)
Class, Semester	First Year B. Tech., Sem I &II
Course Code	7ME157
Course Name	Engineering Graphics Lab
Desired Requisites:	Basic Knowledge of Computer

Teaching Scheme		**Examination Scheme (Marks)**			
Practical	2Hrs/Week	**LA1**	**LA2**	**ESE**	**Total**
Interaction	----	30	30	40	100
		Credits: 1			

Course Objectives

1	To impart the techniques of engineering graphics.
2	To prepare the students for applying knowledge of engineering graphics in real life drawings.
3	To develop the skills of students for evaluating CAD software for its applications

Course Outcomes (CO) with Bloom's Taxonomy Level

At the end of the course, the students will be able to,

CO	**Course Outcome Statement/s**	**Bloom's Taxonomy Level**	**Bloom's Taxonomy Description**
CO1	Understand the basic principle of Engineering graphics.	II	Understanding
CO2	Draw different views of components using the first angle projection method.	III	Applying
CO3	Apply the knowledge of engineering graphics in real life applications.	III	Applying

List of Experiments / Lab Activities

List of Experiments:

Submission of drawing on following topics (use of CAD software)

1: Plane Curves and Conic Sections (Min. 5 Problems)
2: Projections of Points and Lines (Min. 5 Problems)
3: Projections of Planes and Solids (Min. 6 Problems)
4: Development of Lateral Surfaces (Min. 3 Problems)
5: Orthographic Projections (Min. 2 Problems)
6: Isometric Projections (Min. 2 Problems)

Text Books

1	Bhatt N.D., Panchal V.M. and Ingle P.R., Engineering Drawing, Charotar Publishing House, 2014
2	Shah, M.B. and Rana B.C., Engineering Drawing and Computer Graphics, Pearson Education, 2008.
3	Agrawal B. and Agrawal C. M., Engineering Graphics, TMH Publication, 2012.

References

1	Narayana, K.L. and P Kannaiah, Text book on Engineering Drawing, Scitech Publishers, 2008.
2	Warren J. Luzzader, Fundamentals of Engineering Drawing, Prentice Hall of India, New Delhi, 2010
3	Fredderock E. Giesecke, Alva Mitchell others, Principles of Engineering Graphics, Maxwell McMillan Publishing, 2010

Useful Links

1	https://nptel.ac.in/courses/112/103/112103019/

2	https://nptel.ac.in/courses/105/104/105104148/
3	https://www.youtube.com/watch?v=xXdpkQXDuMw&list=PL9RcWoqXmzaJT-fliqTSwUjWU4zCX_H2A

CO-PO Mapping For Mechanical Engineering Department															
	Programme Outcomes (PO)												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	
CO1	3				2					1		1	2		
CO2			2												
CO3					3					1					
The strength of mapping is to be written as 1,2,3; Where, 1:Low, 2:Medium, 3:High															

CO-PO Mapping For Civil Engineering Department															
	Programme Outcomes (PO)												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	
CO1	3		3		3					1		1			
CO2			2												
CO3					3					1					
The strength of mapping is to be written as 1,2,3; Where, 1:Low, 2:Medium, 3:High															

Assessment				
There are three components of lab assessment, LA1, LA2 and Lab ESE. IMP: Lab ESE is a separate head of passing.(min 40 %), LA1+LA2 should be min 40%				
Assessment	**Based on**	**Conducted by**	**Typical Schedule**	**Marks**
LA1	Lab activities, attendance, journal	Lab Course Faculty	During Week 1 to Week 8 Marks Submission at the end of Week 8	30
LA2	Lab activities, attendance, journal	Lab Course Faculty	During Week 9 to Week 16 Marks Submission at the end of Week 16	30
Lab ESE	Lab activities, journal/ performance	Lab Course Faculty and External Examiner as applicable	During Week 18 to Week 19 Marks Submission at the end of Week 19	40
Week 1 indicates starting week of a semester. Lab activities/Lab performance shall include performing experiments, mini-project, presentations, drawings, programming, and other suitable activities, as per the nature and requirement of the lab course. The experimental lab shall have typically 8-10 experiments and related activities if any.				

Walchand College of Engineering, Sangli

(Government Aided Autonomous Institute)

AY 2023-24

Course Information

Programme	First Year B. Tech. (Mech, Civil, CSE, IT)
Class, Semester	First Year B. Tech., Sem I/II
Course Code	7EE156
Course Name	Electrical and Electronics Engineering Lab
Desired Requisites:	12th Physics

Teaching Scheme		**Examination Scheme (Marks)**			
Practical	3 Hrs/ Week	**LA1**	**LA2**	**Lab ESE**	**Total**
Interaction	-	30	30	40	100
		Credits: 3			

Course Objectives

1	This course intends to demonstrate basic knowledge of Electrical engineering.
2	It intends to develop skills to recognize working principle, construction and types of electrical Machines.
3	This course intends to demonstrate basic knowledge of Electronics engineering.
4	To provide knowledge of electronic components and circuits to first year engineering students, so that they can understand, design and implement simple analog / digital electronic circuits.

Course Outcomes (CO) with Bloom's Taxonomy Level

At the end of the course, the students will be able to,

CO	Course Outcome Statement/s	Bloom's Taxonomy Level	Bloom's Taxonomy Description
CO1	**Describe** basic concepts of electrical circuits and various theorems.	II	Understanding
CO2	**Demonstrate** the use of transformers and AC/DC machines.	III	Applying
CO3	**Identify and explain** use of electronics components and instruments.	II	Understanding
CO4	**Construct** digital IC, diode, transistor and op-amp based circuits.	III	Applying

List of Experiments / Lab Activities/Topics

List of Topics(Applicable for Interaction mode): Electrical

1. To study AC and DC machines parts and their functions.
2. Study of AC/DC motor starters.
3. To study servo motor/ steeper motor with application.
4. Study of installation techniques using fuse, MCB and MCCB.
5. Measure voltage, current and power in single phase R-C series circuit.
6. Measure Voltage, current and power factor of 1-phase A.C R-L series circuit.

List of Lab Activities: Electrical

1. Electrical Safety Measures.
2. To study series-parallel RL, RC and RLC circuits
3. To verify KVL and KCL theorems.
4. To study speed control techniques of ac and dc machines.
5. To perform load test on transformer.
6. Find out equivalent resistance in series and parallel connection.

List of Lab Activities: Electronics

1. Identification of components and instruments required in lab to perform experiments in basic electronics engineering.
2. Realization of logic gates using basic building block (NAND/NOR).
3. Implementation of combinational and sequential logic circuit.
4. Study of half-wave and full-wave rectifier.
5. Study of diode-based clipper and clamper circuits
6. Study of transistor as a switch.
7. Study of inverting and non-inverting amplifier using op-amp.

Textbooks	
1	D.C. Kulshreshtha, “Basic Electrical Engineering”, 1 st revised editionMcGraw Hill, 2012.
2	D.P Kothari and I.J Nagrath, “Basic Electrical Engineering”,Tata McGraw Hill, 2010.
3.	R. P. Jain, “Modern Digital Electronics”, 4th edition, Tata McGraw Hill, 2009.
4.	Robert Boylestad, Louis Nashelsky, 11th edition, “Electronic Devices and Circuits, Pearson, 2015.
5.	Ramakant Gaikwad, “Op-amp and Linear Integrated Circuits”, 4th edition, Pearson, 2015.

References	
1	V. N. Mittle and Arvind Mittal, “Basic Electrical Engineering”, 2 nd edition, Tata McGraw Hill.
2	Morris Mano, “Digital Design”, Pearson, 4th edition, 2011
3	Donald A. Neamen, “Electronic Circuit Analysis and Design”, 3rd edition, Tata McGraw Hill, 2011
4	Robert F. Coughlin and Frederick F. Driscoll, “Operational Amplifiers and Linear Integrated Circuits”, 6th edition, PHI, 2009

Useful Links	
1	Virtual Labs ,An Initiative of Ministry of Education Under the National Mission on Education through ICT, 1. https://www.vlab.co.in/broad-area-electrical-engineering 2. http://vlabs.iitkgp.ac.in/asnm/#
2	Virtual Labs, An Initiative of Ministry of Education Under the National Mission on Education through ICT:Basic Electronics
3	https://nptel.ac.in/courses/122106025

CO-PO Mapping

	Programme Outcomes (PO)												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	3													
CO2	3								2					
CO3	3													
CO4	3								2					

The strength of mapping is to be written as 1,2,3; where, 1: Low, 2: Medium, 3: High
Each CO of the course must map to at least one PO, and preferably to only one PO.

Assessment

There are three components of lab assessment, LA1, LA2 and Lab ESE.
IMP: Lab ESE is a separate head of passing.(min 40 %), LA1+LA2 should be min 40%

Assessment	Based on	Conducted by	Typical Schedule	Marks
LA1	Lab activities, attendance, journal	Lab Course Faculty	During Week 1 to Week 8 Marks Submission at the end of Week 8	30
LA2	Lab activities, attendance, journal	Lab Course Faculty	During Week 9 to Week 16 Marks Submission at the end of Week 16	30
Lab ESE	Lab activities, journal/ performance	Lab Course Faculty and External Examiner as applicable	During Week 18 to Week 19 Marks Submission at the end of Week 19	40

Week 1 indicates starting week of a semester. Lab activities/Lab performance shall include performing experiments, mini-project, presentations, drawings, programming, and other suitable activities, as per the nature and requirement of the lab course. The experimental lab shall have typically 8-10 experiments and related activities if any.

Walchand College of Engineering, Sangli

(Government Aided Autonomous Institute)

AY 2023-24

Course Information

Programme	B.Tech. (Mechanical)
Class, Semester	First Year B. Tech., Sem-I
Course Code	7ME151
Course Name	Elements of Mechanical Engineering lab
Desired Requisites:	

Teaching Scheme		**Examination Scheme (Marks)**			
Practical	2Hrs/Week	**LA1**	**LA2**	**ESE**	**Total**
Interaction	----	30	30	40	100
		Credits: 1			

Course Objectives

1	To impart the techniques of Manufacturing Systems.
2	To prepare the students for applying knowledge of Mechanical engineering.
3	To develop the skills of students in basic Mechanical Engineering processes.

Course Outcomes (CO) with Bloom's Taxonomy Level

At the end of the course, the students will be able to,

CO	**Course Outcome Statement/s**	**Bloom's Taxonomy Level**	**Bloom's Taxonomy Description**
CO1	Understand the thermodynamic systems: power-producing absorbing devices.	I	Remembering
CO2	Apply kinematics principles to estimate mobility parameters of mechanisms	III	Applying
CO3	Understanding basic elements of power transmission in Mechanical systems	II	Understanding

List of Experiments / Lab Activities

List of lab activities:

1. Study and demonstration of the steam power plant.
2. Study and demonstration of two-stroke internal combustion engines
3. Study and demonstration of four-stroke internal combustion engines
4. Study and demonstration of the refrigeration system.
5. Study and demonstration of air conditioning system.
6. Study and demonstration of pumps.
7. Study of basic mechanisms like four bar, slider crank, etc.
8. Estimation of degrees of freedom for given mechanism using Gruebeler's criterion
9. Demonstration on type of gears and gear trains
10. Demonstration on type of belt drives
11. Demonstration on type of bearings

12 Study of gear tooth profiles

Text Books

1	Beer and Johnson, Mechanics of Materials, McGraw Hill, 6th Edition , 2013
2	S S Rattan, Theory of Machines, McGraw Hill, 3rd edition, 2016
3	R,Yadav, Applied Thermodynamics, Central Publishing House, 3rd Edition, 2011

References

1	Den Hartog, Jacob P., Strength of Materials. Dover Publications Inc., 3rd Edidtion 1961
2	Yunus A Cengel and Michael Boles, Thermodynamics:An engineering approach, McGraw Hill, 9th Edition, 2015

3	Richard Crowson, "Introduction to Manufacturing Processes," McGraw-Hill Education, 2017.

Useful Links	
1	https://archive.nptel.ac.in/courses/112/104/112104188/
2	https://www.youtube.com/watch?v=kC2SEiGaqoA
3	https://nptel.ac.in/courses/112104304

CO-PO Mapping For Mechanical Engineering Department															
	Programme Outcomes (PO)												**PSO**		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	
CO1	3				2					1		1	2		
CO2			2												
CO3					3					1					
The strength of mapping is to be written as 1,2,3; Where, 1:Low, 2:Medium, 3:High															

Assessment				
There are three components of lab assessment, LA1, LA2 and Lab ESE. IMP: Lab ESE is a separate head of passing.(min 40 %), LA1+LA2 should be min 40%				
Assessment	**Based on**	**Conducted by**	**Typical Schedule**	**Marks**
LA1	Lab activities, attendance, journal	Lab Course Faculty	During Week 1 to Week 8 Marks Submission at the end of Week 8	30
LA2	Lab activities, attendance, journal	Lab Course Faculty	During Week 9 to Week 16 Marks Submission at the end of Week 16	30
Lab ESE	Lab activities, journal/ performance	Lab Course Faculty and External Examiner as applicable	During Week 18 to Week 19 Marks Submission at the end of Week 19	40
Week 1 indicates starting week of a semester. Lab activities/Lab performance shall include performing experiments, mini-project, presentations, drawings, programming, and other suitable activities, as per the nature and requirement of the lab course. The experimental lab shall have typically 8-10 experiments and related activities if any.				

Walchand College of Engineering, Sangli

(Government Aided Autonomous Institute)

AY 2023-24

Course Information

Programme	B. Tech. (All Branches)
Class, Semester	First Year B. Tech., Sem.-I
Course Code	7VS152
Course Name	Engineering Skills Laboratory
Desired Requisites:	-

Teaching Scheme		**Examination Scheme (Marks)**			
Practical	2 Hrs/Week	**LA1**	**LA2**	**Lab ESE**	**Total**
Interaction	-	30	30	40	100
		Credits: 1			

Course Objectives

1	To provide basic knowledge of handling electrical equipment and safety.
2	To impart skills to plan and implement simple electrical wiring.
3	To **provide** exposure to the students with hands on experience on various basic engineering practices in Electrical and Electronics Engineering.
4	To explain the working of small electronic gadget like electronic bell, emergency lamp etc.

Course Outcomes (CO) with Bloom's Taxonomy Level

At the end of the course, the students will be able to,

CO	**Course Outcome Statement/s**	**Bloom's Taxonomy Level**	**Bloom's Taxonomy Description**
CO1	**Identify** the instruments for measurement of electrical parameters.	I	Remembering
CO2	**Illustrate** working of switchgear for electrical safety and protections.	III	Applying
CO3	**Identify and explain** the use of electronic instruments.	II	Understanding
CO4	**Build and Test** simple electronic gadget.	III	Applying

List of Experiments / Lab Activities/Topics

List of Lab Activities: (minimum 08 experiments)

Engineering Skills (Electrical)

Module 1:

i. Measurement of Electrical Parameters in DC Circuits.

ii. Measurement of Electrical Parameters in Single Phase AC Circuits.

Module 2:

i. Study of various types of wires and cables.

ii. Basic wiring schemes for residential and industrial applications.

iii. Demonstrate the operation of fuse, MCCB, ELCB

Module 3:

i. Preparation of Earthing Pit for Electrical Installation Safety.

ii. Dismantling, Assembly and Fault Finding of Ceiling Fans / Table Fans, Automatic Electric Iron, Plate Tube Water Heater, Use of Megger.

Engineering Skills (Electronics)

Module 1: Introduction to Lab Instruments like CRO, Power supply, Oscillator, Multi meter. Frequency measurement, AC-DC voltage measurement using CRO and multi meter

Module 2: Study of components (Resistance, capacitor, Diode, Transistor, Transformer, switches, relays, PCB etc.) testing and lead identification

Module 3: Electronics Gadget building & testing (Gadget must work)

Textbooks

1	Make: Electronics, by Charles Platt, Published by Maker Media, 2015
2	Electronics Projects For Dummies, by by Earl Boysen and Nancy Muir, Published by Wiley Publishing, Inc., 2006
3	D.C. Kulshreshtha, “Basic Electrical Engineering”, 1 st revised editionMcGraw Hill, 2012.
4	D.P Kothari and I.J Nagrath, “Basic Electrical Engineering”,Tata McGraw Hill, 2010.
References	
1	Paul Horowitz, Winfield Hill, “The Art of Electronics”, Cambridge University Press, 1989
2	E-learning material through Intranet/Internet
3	V. N. Mittle and Arvind Mittal, “Basic Electrical Engineering”, 2 nd edition, Tata McGraw Hill.
4	
Useful Links	
1	
2	
3	
4	

CO-PO Mapping														
	Programme Outcomes (PO)												**PSO**	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1			1		2				1				1	
CO2			1		2				1				1	
CO3				2					1					1
CO4				2					1					2
The strength of mapping is to be written as 1,2,3; where, 1: Low, 2: Medium, 3: High Each CO of the course must map to at least one PO, and preferably to only one PO.														

Assessment				
There are three components of lab assessment, LA1, LA2 and Lab ESE. IMP: Lab ESE is a separate head of passing.(min 40 %), LA1+LA2 should be min 40%				
Assessment	**Based on**	**Conducted by**	**Typical Schedule**	**Marks**
LA1	Lab activities, attendance, journal	Lab Course Faculty	During Week 1 to Week 8 Marks Submission at the end of Week 8	30
LA2	Lab activities, attendance, journal	Lab Course Faculty	During Week 9 to Week 16 Marks Submission at the end of Week 16	30
Lab ESE	Lab activities, journal/ performance	Lab Course Faculty and External Examiner as applicable	During Week 18 to Week 19 Marks Submission at the end of Week 19	40
Week 1 indicates starting week of a semester. Lab activities/Lab performance shall include performing experiments, mini-project, presentations, drawings, programming, and other suitable activities, as per the nature and requirement of the lab course. The experimental lab shall have typically 8-10 experiments and related activities if any.				

F.Y.B.Tech Mechanical

SEM-II Syllabus

AY 2023-24

(DAC UG)

Walchand College of Engineering, Sangli

(Government Aided Autonomous Institute)

AY 2023-24

Course Information	
Programme	B.Tech. (Civil/ Mechanical)
Class, Semester	First Year B. Tech., Sem- II
Course Code	7MA102
Course Name	Engineering Mathematics –II (Civil/Mech)
Desired Requisites:	Mathematics course at Higher Secondary Junior College

Teaching Scheme		**Examination Scheme (Marks)**			
Lecture	3 Hrs/week	**MSE**	**ISE**	**ESE**	**Total**
Tutorial	1 Hrs/week	30	20	50	100
		Credits: 04			

Course Objectives	
1	Familiarize the students with techniques in multivariate integration and Differential equation.
2	Awareness about Mathematics fundamental necessary to solve and analyse the Engineering problem
3	
4	

Course Outcomes (CO) with Bloom's Taxonomy Level		
At the end of the course, the students will be able to,		
CO1	Understand the Mathematical Tools that are needed to solve Engineering problem	Understanding
CO2	Solve the problems in multivariable calculus,	Applying
CO3	Apply the statistical technique to interpret the data	Applying
CO4		

Module	**Module Contents**	**Hours**
I	**Beta-Gamma Functions:** Definition of Beta, Gamma functions and properties of Beta Gamma functions	**6**
II	**Curve tracing** Tracing of curves for Cartesian and polar coordinate	**5**
III	**Multivariable Calculus:** Multiple Integrals: Double integrals, change of order of integration, change of variables (Cartesian to polar) Evaluation of triple integrals, Application of Multiple integrals such as Area enclosed by plane curves, Mass of lamina, Volume of solid.	**8**
IV	**Linear Differential equations of nth order with constant coefficient:** Linear Differential equation with constant coefficient, Complementary function, Particular Integral, Homogeneous Linear Differential equation	**8**

V	**Applications of L.D.E with constant coefficient:** Applications of L.D.E with constant coefficient to Civil and Mechanical Engineering	**5**
VI	**Statistics:** Correlation, Linear regression, Curve fitting (a) straight line (b) logarithmic curve**,**	**7**

Textbooks	
1	P. N. and J. N. Wartikar, "A Text Book of Applied Mathematics", Vol I and II", Vidyarthi Griha Prakashan, Pune, 2006
2	B .S. Grewal , "Higher Engineering Mathematics", Khanna Publication, 44th Edition , 2017.
3	S.C. Gupta, "Fundamentals of Mathematical Statistics and probability", Sultan chand &Sons,2014.
4	

References	
1	Erwin Kreyszig, "Advanced Engineering Mathematics", Wiley Eastern Limited Publication, 2015, 10th Edition
2	Wylie C.R, "*Advanced Engineering Mathematics",* Tata McGraw Hill Publication, 8th Edition, 1999
3	H. K. Dass *, "Higher Engineering Mathematics",* S. Chand & Company Ltd., 1st Edition 2014.
4	S. S. Sastry, *"Engineering Mathematics (Volume-I)",* Prentice Hall Publication, 3rd Edition 2006

Useful Links	
1	https://www.youtube.com/watch?v=KgItZSst2sU
2	https://nptel.ac.in/courses/111105121
3	
4	

CO-PO Mapping

	Programme Outcomes (PO)												**PSO**	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	2			1										
CO2	2			1										
CO3	2			1										
CO4														

The strength of mapping is to be written as 1: Low, 2: Medium, 3: High
Each CO of the course must map to at least one PO.

Assessment
The assessment is based on MSE, ISE and ESE. MSE shall be typically on modules 1 to 3. ISE shall be taken throughout the semester in the form of teacher's assessment. Mode of assessment can be field visit, assignments etc. and is expected to map at least one higher order PO. ESE shall be on all modules with around 40% weightage on modules 1 to 3 and 60% weightage on modules 4 to 6. For passing a theory course, Min. 40% marks in (MSE+ISE+ESE) are needed and Min. 40% marks in ESE are needed. (ESE shall be a separate head of passing)

Walchand College of Engineering, Sangli

(Government Aided Autonomous Institute)

AY 2023-24

Course Information	
Programme	B.Tech. (Civil /Mech)
Class, Semester	First Year B.Tech., Sem I / II
Course Code	7PH101
Course Name	Engineering Physics (Civil /Mech)
Desired Requisites:	Students are expected to know the basic concept in Physics.

Teaching Scheme		**Examination Scheme (Marks)**			
Lecture	03Hrs/week	MSE	ISE	ESE	Total
Tutorial	0 Hrs/week	30	20	50	100
		Credits: 3			

Course Objectives	
1	To provide basic concepts to solve many engineering and technical issues.
2	To give deep insights into the understanding of engineering courses.
3	To encourage them to understand engineering and technical development.

Course Outcomes (CO) with Bloom's Taxonomy Level

At the end of the course, the students will be able to,

CO	**Course Outcome Statement/s**	**Bloom's Taxonomy Level**	**Bloom's Taxonomy Descriptor**
CO1	Exhibit memory of previously learned information by recal ling facts, terms, basic concepts in Wave Optics, Modern Physics and Quantum Mechanics, Ultrasonic, Semiconductors, Nanoscience and Nanotechnology, Acoustics.	1	Remembering
CO2	Demonstrate understanding of facts and ideas by recalling, comparing, interpreting for all terms in these modules.	2	Understanding
CO3	Solve problems to new situations by applying acquired knowledge, facts, techniques and rules for various concepts in a different way.	3	Applying

Module	**Module Contents**	**Hours**
I	**Wave optics:** Introduction, interference of light, Newton's rings, Fresnel's diffraction: Fresnel's half-period zones, zone plate and diffraction at a straight edge. Fraunhofer's diffraction: Diffraction due to single slit, Diffraction due to double slits, Plane diffraction grating.	6
II	**Modern Physics and Quantum mechanics:** Introduction, black body radiation, Planck's quantum theory, Wien's displacement law and Rayleigh – Jeans law, phase velocity, group velocity and particle velocity, de-Broglie's hypothesis, Photoelectric effect, Compton effect, Heisenberg's uncertainty principle and applications, wave function and physical significance, Schrödinger's wave equation: time dependent and time independent, Eigen value and Eigen function.	8
III	**Ultrasonic:** Introduction, generation of ultrasonic waves (Magnetostriction and Piezoelectric method), detection of ultrasonic waves by Kundt's tube, thermal detection and sensitive flame method, velocity of ultrasonic waves in liquid, applications of ultrasonic waves in scientific and engineering field.	6

IV	**Semiconductors:** Introduction, formation of energy bands, classification of solid on basis of band theory, number levels in a band, density of states, Fermi-Dirac statistics, Fermi level, variation of Fermi level with temperature, electrical conductivity of metal and semiconductor, Hall effect, basic concept of p-n junction.	7
V	**Nanoscience and Nanotechnology** Introduction to nano-science and nanotechnology, Surface to volume ratio, Two main approaches in nanotechnology -Bottom up technique and top down technique. Nano materials: Methods to synthesize nanomaterials (Ball milling, Sputtering, Vapour deposition, sol gel), properties and applications of nanomaterials. Applications of nanomaterials, Introduction to Carbon Nanotubes and its applications.	6
VI	**Acoustics**: Introduction, Types of Acoustics, reverberation and reverberation time, absorption power and absorption coefficient, Requisites for acoustics in auditorium, Sabine's formula, measurement of absorption coefficient, factors affecting the acoustics and remedial measures, Noise and its Measurements, Sound Insulation and its measurements. Impact of Noise in Multi-storied buildings.	6

Textbooks

1	M. N. Avadhanulu and P. G. Kshirsagar, "*A Text book of Engineering Physics*", S.Chand Pub.
2	R. K. Gaur and S. L. Gupta *"Engineering Physics",* Dhanpat Rai Publications, 2011

References

1	Halliday, Resnic and Walker, *"Fundamentals of Physics"*, John Wiley, 9th edition 2011.
2	A. Beiser, *"Concepts of Modern Physics",* McGraw Hill International, 5th edition, 2003.
3	Ajoy Ghatak, *"Optics",* Tata McGraw Hill 5th edition, 2012.
4	Charles P.Poole and Frank J. Owner, "*Introduction to Nanotechnology*", Wiley India.
5	G. Cao *"Nanostructures and Nanomaterials: Synthesis, Properties and Applications"* Imperial College Press, 2004.

Useful Links

1	For optics https://nptel.ac.in/courses/122/107/122107035/
2	For Quantum Physics https://nptel.ac.in/courses/122/106/122106034/
3	For Ultrasonic https://freevideolectures.com/course/3531/engineering-physics-i/8
4	For Solid State Physics https://nptel.ac.in/courses/115/105/115105099/
5	For Introduction to Nanotechnology https://youtu.be/ebO38bbq0_4
6	For acoustics https://youtu.be/fHBPvMDFyO8

CO-PO Mapping

	Programme Outcomes (PO)												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	2													
CO2	2													
CO3	2													

The strength of mapping is to be written as 1: Low, 2: Medium, 3: High
Each CO of the course must map to at least one PO.

Assessment

The assessment is based on MSE, ISE and ESE.
MSE shall be typically on modules 1 to 3.
ISE shall be taken throughout the semester in the form of teacher's assessment. Mode of assessment can be Tests, assignments, oral, seminar etc. and is expected to map at least one higher order PO.
ESE shall be on all modules with around 30 - 40% weightage on modules 1 to 3 and 60 - 70% weightage on modules 4 to 6.
For passing a theory course, Min. 40% marks in (MSE+ISE+ESE) are needed and Min. 40% marks in ESE are needed. (ESE shall be a separate head of passing)

Walchand College of Engineering, Sangli

(Government Aided Autonomous Institute)

AY 2023-24

Course Information	
Programme	B.Tech. (Civil and Mechanical Engineering)
Class, Semester	First Year B. Tech., Sem I/II
Course Code	7AM101
Course Name	Engineering Mechanics
Desired Requisites:	Physics, Mathematics

Teaching Scheme		**Examination Scheme (Marks)**			
Lecture	3 Hrs/week	**MSE**	**ISE**	**ESE**	**Total**
Tutorial	---	30	20	50	100
		Credits: 3			

Course Objectives	
1	To impart knowledge on fundamentals of mechanics
2	To provide knowledge of basic concepts and system of forces in statics and dynamics
3	To illustrate the principles of mechanics in engineering applications

Course Outcomes (CO) with Bloom's Taxonomy Level

At the end of the course, the students will be able to,

CO	**Course Outcome Statement/s**	**Bloom's Taxonomy Level**	**Bloom's Taxonomy Description**
CO1	Explain concept & principles of forces with respect to engineering applications	II	Understanding
CO2	Apply the concepts of force, stresses and strains for analysis of trusses and solid bodies	III	Applying
CO3	Apply the concepts of Newton's laws of motion, D'Alemberts principles to solve problems related to dynamic system	III	Applying

Module	**Module Contents**	**Hours**
I	**Forces** Fundamentals, Systems, Composition and Resolution, Resultant of planar force systems. Free Body Diagram, Laws of Forces, Varignon's Theorem, Lami's Theorem	8
II	**Equilibrium** Equilibrium conditions, Concept of determinacy and indeterminacy Beams: Types of Supports, Loads and Reactions Principle of Virtual Work and its applications to statically determinate beams	7
III	**Centroid and Moment of Inertia** Centre of gravity and Centroid, Moment of Inertia of Plane figure, Composite Sections, Radius of gyration, Mass-Moment of Inertia	5
IV	**Plane Trusses** Pin-jointed statically determinate plane trusses: Assumptions, imperfect, perfect and redundant trusses, Analysis by Method of joints, method of sections	5
V	**Concept of Stress and Strain:** Normal and shear stress and strain, State of stress at a point, Stress strain curve, Hook's law, Modulus of elasticity, Poisson's ratio, Modulus of rigidity, Bulk modulus	8

VI	**Dynamics of Particles:** Rectilinear Motion, Motion of Projectile, Kinetics – Newton's laws of motion, D'Alemberts principle, Applications to rough inclined plane, lift, and connected bodies, Collisions: Impact, Collision of bodies, Coefficient of Restitution, Loss of Kinetic Energy due to Impact	7

Textbooks	
1	Ramamrutham., S. "Textbook of Applied Mechanics", Dhanpat Rai Publishing Company Limited, 2008.
2	Bhavikatti., S. S. and Rajashekarappa., K. G. "Engineering Mechanics", New Age International Publishers, 2015, 5th Edition.
3	Beer, F. P. and Johnston, E. R. "Vector Mechanics for Engineers Vol. I and II", McGraw Hill Company Publication, 2011, 9th Edition.
References	
1	Singer, F. L. "Engineering Mechanics Statics & Dynamics", B. S. Publications, 2011.
2	Timoshenko, S. and Young, D. H. "Engineering Mechanics", McGraw Hill Companies, 2008, 4th Edition.
3	Meriam, L. and L.G. Kraige, "Engineering Mechanics – Dynamics", John Wiley & Sons, 2002, 6th Edition.
4	F. P. Beer and E. R. Johnston, Mechanics of materials, McGraw-Hill International
Useful Links	
1	https://nptel.ac.in/courses/112106286
2	https://www.youtube.com/watch?v=9Yt3I4bP-90

CO-PO Mapping

	Programme Outcomes (PO)												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	3													
CO2	3	1												
CO3	3	1												
CO4														

The strength of mapping is to be written as 1: Low, 2: Medium, 3: High
Each CO of the course must map to at least one PO.

Assessment

The assessment is based on MSE, ISE and ESE.
MSE shall be typically on modules 1 to 3.
ISE shall be taken throughout the semester in the form of teacher's assessment. Mode of assessment can be field visit, assignments etc. and is expected to map at least one higher order PO.
ESE shall be on all modules with around 40% weightage on modules 1 to 3 and 60% weightage on modules 4 to 6.
For passing a theory course, Min. 40% marks in (MSE+ISE+ESE) are needed and Min. 40% marks in ESE are needed. (ESE shall be a separate head of passing)

Walchand College of Engineering, Sangli

(Government Aided Autonomous Institute)

AY 2023-24

Course Information	
Programme	B. Tech. (Mechanical)
Class, Semester	First Year B. Tech. Sem. I/II
Course Code	7CV106
Course Name	Basic Civil Engineering.
Desired Requisites:	Nil

Teaching Scheme		**Examination Scheme (Marks)**			
Lecture	2 Hrs/week	**MSE**	**ISE**	**ESE**	**Total**
Tutorial	-	30	20	50	100
		Credits: 2			

Course Objectives	
1	To, familiarize with Building Systems and Sustainable Construction: Students will gain knowledge about building systems, including structural systems and their various components and functions.
2	To introduce students to different types of construction equipment used on construction sites, enhancing their understanding of efficient project execution and management.
3	To, acquire Proficiency in Surveying, Construction Materials, and Equipment: Through this course, students will develop practical skills in surveying techniques and measurement methods. They will also gain insights into various construction materials, their properties, and applications in civil engineering projects.

Course Outcomes (CO) with Bloom's Taxonomy Level

At the end of the course, the students will be able to,

CO	**Course Outcome Statement/s**	**Bloom's Taxonomy Level**	**Bloom's Taxonomy Description**
CO1	Identify different types of building systems, their components, and functions.	II	Knowledge
CO2	Describe the importance of smart cities in modern urban development and its challenges.	II	Understanding
CO3	Select appropriate construction equipment based on project requirements and constraints.	III	Apply

Module	**Module Contents**	**Hours**
I	**Introduction to Civil Engineering** Scope of civil engineering, Disciplines of civil engineering, Role of Civil Engineers in infrastructure development, Building Systems: Conceptualization, Need for buildings, Defining Sustainability for Building systems, Structural systems; Load bearing, Framed, Prefabricated, Pre Engineered Construction, Loads on Building, Components in Buildings and their functions, building bye laws, Principle of building planning	5
II	**Surveying and Construction Materials** Principles of surveying, Distance measurement, Levelling, Construction materials and classification, Properties and uses of stone, brick, tile, timber, cement, sand, lime, mortar, concrete, bitumen and steel	5
III	**Construction Equipment** Necessity of Construction Equipment and types, Earth moving equipment: Excavator, bulldozer, and loader, Material handling equipment: Cranes, hoists, and conveyors. Concrete equipment: Concrete pumps, mixers, and vibrators, Asphalt equipment: Asphalt pavers and compactors.	4
IV	**Transportation Engineering** Modes of surface transport, Functional Classification of Highway Systems, Typical Cross section of a Highway. Introduction to Railways, Airport, Docks and Harbours, functions, types, layouts	4

V	**Hydraulic Structures** Sources of water, Hydraulic structures: Dam, Reservoir, Barrage, Weirs, Canal, Hydropower plant, Irrigation systems	4
VI	**Smart Cities** The Challenge of Urbanization, Sustainable environment Smart city: Infrastructure elements, Features, Strategic components of development, The Process of Selection, Smart Cities in India, A typical smart city in India	4

Textbooks	
1	Bhavikatti S.S "Basic Civil Engineering", I.K. International Publishing House Pvt. Ltd.
2	B.C. Punmia, Ashok Kumar Jain, and Arun Kumar Jain "Surveying Vol. I and II"
3	S.K. Garg Water Supply Engineering, Khanna Publishers, 15th edition
4	Hirasakar G. K., "Basic Civil Engineering", DhanpatRai publications, 1st Edition,2007

References	
1	Robert Peurifoy, Clifford J. Schexnayder, Aviad Shapira, Construction Planning, Equipment and Methods, McGraw Hill Education, 7th edition, 2010
2	Smart Cities Mission Statement & Guidelines, Ministry of Urban Development Government of India

Useful Links

CO-PO Mapping

	Programme Outcomes (PO)												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	2											2		
CO2	2	2								2		2		
CO3	2		2							2		2		

The strength of mapping is to be written as 1: Low, 2: Medium, 3: High
Each CO of the course must map to at least one PO.

Assessment

The assessment is based on MSE, ISE and ESE.
MSE shall be typically on modules 1 to 3.
ISE shall be taken throughout the semester in the form of a teacher's assessment. The mode of assessment can be field visits, assignments etc. and is expected to map at least one higher order PO.
ESE shall be on all modules with around 40% weightage on modules 1 to 3 and 60% weightage on modules 4 to 6.
For passing a theory course, Min. 40% marks in (MSE+ISE+ESE) are needed, and Min. 40% marks in ESE are needed. (ESE shall be a separate head of passing)

Walchand College of Engineering, Sangli
(Government Aided Autonomous Institute)

AY 2023-24

Course Information

Programme	B.Tech. (Mechanical Engineering)
Class, Semester	First Year B. Tech. SEM-II
Course Code	7ME102
Course Name	Manufacturing Systems
Desired Requisites:	

Teaching Scheme		**Examination Scheme (Marks)**			
Lecture	3Hrs/week	**MSE**	**ISE**	**ESE**	**Total**
Tutorial	-	30	20	50	100
		Credits: 3			

Course Objectives

1	To impart the techniques of Manufacturing Systems.
2	To prepare the students for applying knowledge of Mechanical engineering.
3	To develop the skills of students in basic Mechanical Engineering processes.

Course Outcomes (CO) with Bloom's Taxonomy Level

At the end of the course, the students will be able to,

CO	**Course Outcome Statement/s**	**Bloom's Taxonomy Level**	**Bloom's Taxonomy Description**
CO1	Recall the basic principle of Mechanical Engineering domain.	I	Remember
CO2	Understand the application areas of manufacturing systems.	II	Understanding
CO3	Apply the knowledge of Manufacturing Systems in real life applications.	III	Applying

Module	**Module Contents**	**Hours**
I	**Introduction to Measurement Techniques** Introduction to Dimensional Measurements, measuring instruments such as calipers, micrometers, gauges , limits, fits tolerance, reading of job drawing.	6
II	**Introduction to Manufacturing Processes** Basics of conventional Manufacturing Processes such as Turning, Milling, Drilling, Grinding, casting etc. Its classifications, Working Principles, Materials, Advantages and Disadvantages.	6
III	**Introduction to Joining and Fabrication Processes** Basics of joining and fabrication processes such as Welding, Cutting, Bending, Brazing, Soldering, Adhesive Bonding. Its classifications, Working Principles, Materials, Advantages and Disadvantages.	7
IV	**Introduction to Non-Conventional Machining** Definition and significance of NCM in modern manufacturing, Comparison with conventional machining processes: advantages and limitations, Overview of various NCM techniques such as EDM, LBM, ECM, WJM, USM, AJM etc. and their applications.	7
V	**Background of Manufacturing Systems and Its Support Systems** Computer applications in Design and manufacture, Design Process : Introduction to Design Process / Materials , Processes, Product Mix / Specs / Classification / Architecture, Conceptual Design, Generation.	6
VI	**Introduction to Automation** Automation in production system, Automation principles and strategies, Elements of Automated system., Advanced automation function, Levels of	7

	Automation, Arguments for and against automation.	

Module wise Measurable Students Learning Outcomes :

The student will learn :

- Different engineering measurement techniques.
- basic manufacturing techniques applicable for production.
- Different joining and fabrication techniques.
- high-precision non-conventional machining processes.
- Background of design processes using CAD.
- automation in manufacturing.

Text Books	
1	Katsundo Hitomi, Manufacturing Systems Engineering: A Unified Approach to Manufacturing Technology, Production Management and Industrial Economics, 2017
2	Jeff Hansen, Manufacturing Systems Engineering, Willford Press, 2017
3	Mikell P. Groover, "Fundamentals of Modern Manufacturing: Materials, Processes, and Systems," Wiley, 2015.

References	
1	Serope Kalpakjian and Steven R. Schmid, "Manufacturing Engineering and Technology," Pearson, 2013.
2	George F. Schrader and Ahmad K. Elshennawy, "Fundamentals of Manufacturing," Society of Manufacturing Engineers, 2012.
3	Richard Crowson, "Introduction to Manufacturing Processes," McGraw-Hill Education, 2017.

Useful Links	
1	https://archive.nptel.ac.in/courses/112/104/112104188/
2	https://www.youtube.com/watch?v=kC2SEiGaqoA
3	https://nptel.ac.in/courses/112104304

CO-PO Mapping For Mechanical Engineering Department

	Programme Outcomes (PO)												**PSO**		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	
CO1	3				2					1		1	2		
CO2			2												
CO3					3					1					

The strength of mapping is to be written as 1,2,3; Where, 1:Low, 2:Medium, 3:High

Assessment

The assessment is based on MSE, ISE and ESE.

MSE shall be typically on modules 1 to 3.

ISE shall be taken throughout the semester in the form of teacher's assessment. Mode of assessment can be field visit, assignments etc. and is expected to map at least one higher order PO.

ESE shall be on all modules with around 40% weightage on modules 1 to 3 and 60% weightage on modules 4 to 6.

For passing a theory course, Min. 40% marks in (MSE+ISE+ESE) are needed and Min. 40% marks in ESE are needed. (ESE shall be a separate head of passing)

Walchand College of Engineering, Sangli

(Government Aided Autonomous Institute)

AY 2023-24

Course Information					
Programme		B.Tech.			
Class, Semester		First Year B.Tech., Sem I &II			
Course Code		7PH155			
Course Name		Engineering Physics Lab.			
Desired Requisites:		Students are expected to know the basic practical knowledge up to HSC			
Teaching Scheme		**Examination Scheme (Marks)**			
Lecture	-	**LA1**	**LA2**	**Lab ESE**	**Total**
Tutorial	-	30	30	40	100
Practical	2 Hrs/week				
Interaction	-	**Credits: 1**			

Course Objectives		
1	To gain practical knowledge by applying the experimental methods to correlate with the physics theory.	
2	To learn the usage of electrical and optical systems for various measurements.	
3	To Apply the analytical techniques and graphical analysis to the experimental data.	
Course Outcomes (CO) with Bloom's Taxonomy Level		
CO1	Calculate the diameter of the thin wire, Planck's constant, Refractive index of liquid / radius of curvature of Plano convex lens , Specific rotation of optical active substances, I-V characteristics of Semiconductor diode, Velocity of sound in air, Calculate R.T for specific hall/auditorium, Verify the expression for the resolving power of a telescope	Applying
CO2	Demonstrate Hartley and Colpitt's oscillator and simulation , Wavelength of light by Plane diffraction grating, Wavelength of light by He-Ne LASER	Applying
List of Experiments / Lab Activities.		
List of Experiments/ Lab Activities- Any Eight Experiments		
1	Find the diameter of the thin wire by diffraction of the light	
2	Determination of wavelength of light by plane diffraction grating.	
3	Determine the Specific rotation of sugar solution	
4	Find the wavelength of He-Ne Laser using Plane diffraction grating.	
5	Verify the expression for the resolving power of a telescope.	
6	Measure the wavelength of ultrasonic waves by Kundt's tube method.	
7	Design and simulate Colpitt's & Hartley Oscillator.	
8	Determine the Planck's constant.	
9	Study the I-V characteristic of semiconductor diode.	
10	Newton's ring: Determination of wavelength of light and refractive index of liquid /radius of curvature of Plano convex lens	
11	To calculate the reverberation time of specific hall.	
12	Determination of Fermi energy of copper using a Wheatstone bridge.	
Text Books		
1	C. L. Arora *"Practical Physics"* S. Chand & Co Edition 2009.	
2	P.R. Sasi Kumar *"Practical Physics"*, PHI Learning Pvt. Ltd 1st edition 2011.	
References		
1	Halliday, Resnic and Walker, *"Fundamentals of Physics"*, John Wiley, 9th edition 2011.	
2	A. Beiser, *"Concepts of Modern Physics"*, McGraw Hill International, 5th edition, 2003.	
3	Ajoy Ghatak, *"Optics"*, Tata McGraw Hill 5th edition, 2012.	
Useful Links		
1	https://nptel.ac.in/courses/115/105/115105121/	
2	https://www.iitg.ac.in/cet/nptel.html	
3	https://youtu.be/imHvRBOMg84	

CO-PO Mapping For All B.Tech. Programs															
	Programme Outcomes (PO)												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	1	1													
CO2	2														
The strength of mapping is to be written as 1,2,3; Where, 1:Low, 2:Medium, 3:High															

Assessment (for Lab. Course)

There are three components of lab assessment, LA1, LA2 and Lab ESE.
IMP: Lab ESE is a separate head of passing. LA1, LA2 together is treated as In-Semester Evaluation.

Assessment	Based on	Conducted by	Typical Schedule (for 26-week Sem)	Marks
LA1	Lab activities, attendance, journal	Lab Course Faculty	During Week 1 to Week 6 Marks Submission at the end of Week 6	30
LA2	Lab activities, attendance, journal	Lab Course Faculty	During Week 7 to Week 12 Marks Submission at the end of Week 12	30
Lab ESE	Lab activities, attendance, journal	Lab Course Faculty	During Week 15 to Week 18 Marks Submission at the end of Week 18	40

Week 1 indicates starting week of a semester. The typical schedule of lab assessments is shown, considering a 26-week semester. The actual schedule shall be as per academic calendar. Lab activities/Lab performance shall include performing experiments, mini-project, presentations, drawings, programming and other suitable activities, as per the nature and requirement of the lab course. The experimental lab shall have typically 8-10 experiments.

Assessment Plan based on Bloom's Taxonomy Level

Bloom's Taxonomy Level	LA1	LA2	Lab ESE	Total
Remember	10	10	15	**35**
Understand	10	10	10	**30**
Apply	10	10	15	**35**
Analyze	0	0	0	**0**
Evaluate	0	0	0	**0**
Create	0	0	0	**0**
Total	**30**	**30**	**40**	**100**

Walchand College of Engineering, Sangli

(Government Aided Autonomous Institute)

AY 2023-2024

Course Information

Programme	First Year B. Tech
Class, Semester	Sem I and Sem II
Course Code	7HS101
Course Name	Communication & Generic skills
Desired Requisites:	10+2 level English

Teaching Scheme		**Examination Scheme (Marks)**				
Lecture	---	**LA1**	**LA2**		**ESE**	**Total**
Tutorial	---	30	30		40	100
Practical	2Hrs/week					
Interaction	1Hr/week	**Credits: 2**				

Course Objectives

1	Enable the students to communicate with clarity and precision.
2	Prepare the students to acquire structure of Oral and written expression required for their profession and enable them to acquire proper behavioural skills
3	Provide relevant knowledge about generic skills, its importance and enable them to understand personal attributes like commitment, loyalty, ethical values, team building, and ensure exposure to personal growth.
4	Infuse the ability to positively consider other's views and to work effectively in teams and teach them self-management skills, problem solving skills and technological skills.

Course Outcomes (CO) with Bloom's Taxonomy Level

CO1	Communicate clearly, precisely and competently in different scenario	Apply
CO2	Acquire basic proficiency in English including reading and listening comprehension, writing and speaking skills.	Understand
CO3	Practice Lifelong Learning (LLL) with positive attitude. loyalty, commitment, reliability, self-development and manage himself/herself physically, intellectually and psychologically.	Apply
CO4	Work ethically and effectively as a team member, manage tasks effectively and apply knowledge to solve problems.	Apply

Module	**Module Contents**	**Hours**
I	**Module 1: Introduction to communicative English** 1.Fundamentals 2. Elements 3.Process 4.Types 5.Barriers 6.Need to develop good interpersonal and intrapersonal skills 7.Developing effective Listening Skills (types, Barriers, listening and note making)	02
II	**Module2: Communicative Grammar & Developing advanced.** **Vocabulary.** 1.Modal verbs, non-modal verbs ,semi-modal verbs 2.Question tags 3.Misplaced Modifiers 4.Passives 5.Phrasal verbs **Vocabulary:** 1. Connectives, 2. Prefixes and suffixes, 3.Synonyms and Antonyms 4.one-word substitutions , 5.Re-arranging Jumbled sentences 6.redundancies	05

III	**Module 3 : Formal Communication Skills** **a. Oral skills:** Developing non-verbal skills. 1.Extempore /Public Speaking Skills (speeches) 2.Group Presentation 3.Individual Presentations **b. Written Skills**: 1.Paragraph Writing 2.Comprehension passage 3.Inter-office communication – Memorandums ,Circulars 4.Report Writing	05
IV	**Module 4: Introduction to Generic Skills** a. Importance of Generic Skill Development (GSD) b. Global and Local Scenario of GSD c. Lifelong Learning (LLL) and associated importance of GSD.	01
V	**Module 5: Self-management skills** **1. Knowing Self for Self-Development. (01 hrs)** a. Self-concept. b. Attitude, c. Self-esteem. d. Self-confidence. e. Self-motivation. **2 Personal Attributes (02 hrs)** a. Loyalty. b. Commitment. c. Honesty and integrity. d. Reliability. e. Enthusiasm. f. Balanced attitude while studying, working and home life. **3. Managing Self – Physical (02 hrs)** a. Personal grooming. b. Health, Hygiene. c. Time Management. **4. Managing Self – Psychological (02 hrs)** a. Stress, Emotions, Anxiety- concepts and significance. b. Exercises related to stress management. c. Techniques to manage the above.	07
VI	**Module 6: Teamwork Skills** **1. Team Building (01 hrs.)** Definition, hierarchy, team dynamics. **2. Team related skills. (02 hrs)** a. Sympathy, empathy. b. co-operation, concern, lead and negotiate. c. work well with people from culturally diverse background. **3. Technological Skills. (02 hrs.)** a. Task Initiation, Task Planning, Task execution, Task close out b. Exercises/case studies on task planning towards development of skills for task management. **4. Problem Solving skills. (02 hrs.)** a. Prerequisites of problem solving- meaningful learning, ability to apply knowledge in problem solving. b. Different approaches for problem solving. c. Steps followed in problem solving. d. Exercises/case studies on problem solving.	07

Text Books	
1	Textbook: Sanjay Kumar, Pushpalata, Communication Skills, Oxford University Press, First edition ,2012
References	
1	Ashraf Rizvi, Effective Technical Communication, Tata McGraw Hills publishing Company 2006
2	William Sanborn Pfeiffer, T.V.S. Padmaja, Technical Communication: A Practical Approach, Pearson, Sixth Edition 2012
3	Exercises in Spoken English, Parts 1 and II CIEFL, Hyderabad, Oxford University Press
Useful Links	
1	www.oupinheonline.com
2	www.scitechpublications.com

CO-PO Mapping

	Programme Outcomes (PO)												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1										1					
CO2										1					
CO3									2			2			
CO4								2	3						

The strength of mapping is to be written as 1,2,3; Where, 1: Low, 2: Medium, 3: High
Each CO of the course must map to at least one PO.

Assessment

The assessment is based on two In-semester evaluations (LA) of 30 marks each, one End-semester examination (ESE) of 40 marks.
LA1 and LA2 are based on the modules taught (typically Module 1-3) and ESE is based on all modules with 30-40% weightage on modules before LA1 and 60-70% weightage on modules LA2.

Assessment Plan based on Bloom's Taxonomy Level

Bloom's Taxonomy Level	LA1	LA2	ESE	Total
Remember				
Understand	10	10	10	**30**
Apply	20	20	30	**60**
Analyse				
Evaluate				
Create				
Total	**30**	**30**	**40**	**100**

Walchand College of Engineering, Sangli

(Government Aided Autonomous Institute)

AY 2023-24

Course Information

Programme	B.Tech. (All Branches)
Class, Semester	First Year B. Tech., Sem I/II
Course Code	7AM155
Course Name	Engineering Mechanics Lab
Desired Requisites:	Engineering Mechanics

Teaching Scheme		**Examination Scheme (Marks)**			
Practical	2 Hrs/ Week	**LA1**	**LA2**	**Lab ESE**	**Total**
Interaction	---	30	30	40	100
		Credits: 1			

Course Objectives

1	To provide hands on practice for the conduct of experiments to verify the principles of mechanics
2	To demonstrate the graphical methods to verify the analytical solutions

Course Outcomes (CO) with Bloom's Taxonomy Level

At the end of the course, the students will be able to,

CO	**Course Outcome Statement/s**	**Bloom's Taxonomy Level**	**Bloom's Taxonomy Description**
CO1	Demonstrate verification of laws and basic principles of mechanics through experiments.	III	Applying
CO2	Apply graphical method to solve problems on force system, beams, and frames.	III	Applying

List of Experiments / Lab Activities/Topics

List of Experiments :

1. Verification of law of triangle of forces
2. Verification of law of polygon of forces
3. Determination of support reactions for Simply Supported Beam
4. Verification of the principle of moments using Bell crank lever apparatus
5. Determination of the coefficient of friction for motion on horizontal plane
6. Determination of the coefficient of friction for motion on inclined plane
7. Analysis of concurrent and non-concurrent coplanar force system by graphical method
8. Analysis of statically determinate beams by graphical method
9. Analysis of pin jointed perfect plane frames by graphical method

Textbooks

1	Lab Manual Link - https://atifmohd077.files.wordpress.com/2019/03/em-lab-manual-1.pdf
2	Lab Manual Links - https://jecassam.ac.in/wp-content/uploads/2018/10/1_Engineering-Mechanics-Laboratory-2nd-SEM-DU-Old-Course.pdf
3	Bhavikatti., S. S. and Rajashekarappa., K. G. "Engineering Mechanics", New Age International Publishers, 2015, 5th Edition.

References

1	Ramamrutham., S. "Textbook of Applied Mechanics", Dhanpat Rai Publishing Company Limited, 2008.
2	Beer, F. P. and Johnston, E. R. "Vector Mechanics for Engineers Vol. I and II", McGraw Hill Company Publication, 2011, 9th Edition.
3	R. K. Bansal "Engineering Mechanics" Laxmi Publications,ltd.

Useful Links	
1	https://nptel.ac.in/courses/112106286
2	https://www.youtube.com/watch?v=9Yt3I4bP-90
3	https://www.vlab.co.in/broad-area-civil-engineering
4	Virtual Lab link by IIT Mumbai - http://vlabs.iitb.ac.in/vlab/labsme.html

CO-PO Mapping

	Programme Outcomes (PO)												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1				1										
CO2		1												

The strength of mapping is to be written as 1,2,3; where, 1: Low, 2: Medium, 3: High
Each CO of the course must map to at least one PO, and preferably to only one PO.

Assessment

There are three components of lab assessment, LA1, LA2 and Lab ESE.
IMP: Lab ESE is a separate head of passing.(min 40 %), LA1+LA2 should be min 40%

Assessment	Based on	Conducted by	Typical Schedule	Marks
LA1	Lab activities, attendance, journal	Lab Course Faculty	During Week 1 to Week 8 Marks Submission at the end of Week 8	30
LA2	Lab activities, attendance, journal	Lab Course Faculty	During Week 9 to Week 16 Marks Submission at the end of Week 16	30
Lab ESE	Lab activities, journal/ performance	Lab Course Faculty and External Examiner as applicable	During Week 18 to Week 19 Marks Submission at the end of Week 19	40

Week 1 indicates starting week of a semester. Lab activities/Lab performance shall include performing experiments, mini-project, presentations, drawings, programming, and other suitable activities, as per the nature and requirement of the lab course. The experimental lab shall have typically 8-10 experiments and related activities if any.

Walchand College of Engineering, Sangli

(Government Aided Autonomous Institute)

AY 2023-24

Course Information

Programme	B. Tech. (Mechanical)
Class, Semester	First Year B. Tech., Sem I
Course Code	7CV156
Course Name	Basic Civil Engineering Lab
Desired Requisites:	

Teaching Scheme		**Examination Scheme (Marks)**			
Practical	2 Hrs/ Week	**LA1**	**LA2**	**Lab ESE**	**Total**
Interaction	-	30	30	40	100
		Credits: 1			

Course Objectives

1	To introduce students to fundamental civil engineering experiments and procedures.
2	To develop practical skills in handling civil engineering equipment and instruments.
3	To promote teamwork, problem-solving, and analytical skills while conducting experiments and interpreting results.

Course Outcomes (CO) with Bloom's Taxonomy Level

At the end of the course, the students will be able to,

CO	**Course Outcome Statement/s**	**Bloom's Taxonomy Level**	**Bloom's Taxonomy Description**
CO1	Demonstrate identification and reading ability of elements in building drawing.	II	Understanding
CO2	Examine the material properties and comment on their quality.	III	Applying
CO3	Use surveying equipment to measure distance and area.	III	Applying

List of Experiments / Lab Activities/Topics

List of Topics (Applicable for Interaction mode):

1. Study and identify basic elements in
   i) Site plan,
   ii) Plan, elevation and section of a residential building
2. Study water supply and sanitation plan of a residential building
3. Field tests on brick
4. Field tests on cement
5. Measurement of horizontal distances by using tape and pedometer
6. Measurement of horizontal angles by using prismatic compass
7. Area measurement by planimeter
8. Determination of levels by Dumpy Level/Auto level
9. Demonstration of total station
10. Study of any two construction equipment

Textbooks

1	Hirasakar G. K., "Basic Civil Engineering", DhanpatRai publications, 1st Edition,2007
2	Gole L.G., "Introduction to Civil Engineering", Mahu Publisher House, 4th Edition, 2005
3	Bhavikatti S.S., "Basic Civil Engineering", New Age Publications, 2010

References

1	Duggal S.K., "Surveying (Vol I)", Tata McGraw Hill, 4th edition 2013
2	Bindra S.P., Arora S.P. , "Building Construction", Dhanpat Rai publication, 5th edition, 2012

Useful Links

CO-PO Mapping														
	Programme Outcomes (PO)												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	3		1											
CO2	3		1											
CO3						2								
The strength of mapping is to be written as 1,2,3; where, 1: Low, 2: Medium, 3: High Each CO of the course must map to at least one PO, and preferably to only one PO.														

Assessment				
There are three components of lab assessment, LA1, LA2 and Lab ESE. IMP: Lab ESE is a separate head of passing.(min 40 %), LA1+LA2 should be min 40%				
Assessment	**Based on**	**Conducted by**	**Typical Schedule**	**Marks**
LA1	Lab activities, attendance, journal	Lab Course Faculty	During Week 1 to Week 8 Marks Submission at the end of Week 8	30
LA2	Lab activities, attendance, journal	Lab Course Faculty	During Week 9 to Week 16 Marks Submission at the end of Week 16	30
Lab ESE	Lab activities, journal/ performance	Lab Course Faculty and External Examiner as applicable	During Week 18 to Week 19 Marks Submission at the end of Week 19	40
Week 1 indicates starting week of a semester. Lab activities/Lab performance shall include performing experiments, mini-project, presentations, drawings, programming, and other suitable activities, as per the nature and requirement of the lab course. The experimental lab shall have typically 8-10 experiments and related activities if any.				

Walchand College of Engineering, Sangli

(Government Aided Autonomous Institute)

AY 2023-24

Course Information

Programme	B.Tech. (Mechanical)
Class, Semester	First Year B. Tech., Sem-II
Course Code	7ME152
Course Name	Manufacturing Systems Lab
Desired Requisites:	

Teaching Scheme		**Examination Scheme (Marks)**			
Practical	2Hrs/Week	**LA1**	**LA2**	**ESE**	**Total**
Interaction	----	30	30	40	100
		Credits: 1			

Course Objectives

1	To impart the techniques of Manufacturing Systems.
2	To prepare the students for applying knowledge of Mechanical engineering.
3	To develop the skills of students in basic Mechanical Engineering processes.

Course Outcomes (CO) with Bloom's Taxonomy Level

At the end of the course, the students will be able to,

CO	**Course Outcome Statement/s**	**Bloom's Taxonomy Level**	**Bloom's Taxonomy Description**
CO1	Recall the basic working principles of Manufacturing and Automation.	I	Remembering
CO2	Understand the basic design process and its applications.	II	Understanding
CO3	Apply the knowledge of geometric dimensioning and tolerancing in real life applications.	III	Applying

List of Experiments / Lab Activities

List of Experiments:

1. Demonstration of basic conventional machining and manufacturing systems. (2 Practicals)
2. Demonstration of Non-Conventional manufacturing techniques. (2 Practicals)
3. Demonstration of metrology measurement techniques. (2 Practicals)
4. Drawing of dimensioning and tolerancing sheet. (2 Practicals)
5. Demonstration of automation lab. (2 Practicals)
6. Demonstration of 3D modelling and PLM techniques. (3 Practicals)

Text Books

1	Katsundo Hitomi, Manufacturing Systems Engineering: A Unified Approach to Manufacturing Technology, Production Management and Industrial Economics, 2017
2	Jeff Hansen, Manufacturing Systems Engineering, Willford Press, 2017
3	Mikell P. Groover, "Fundamentals of Modern Manufacturing: Materials, Processes, and Systems," Wiley, 2015.

References

1	Serope Kalpakjian and Steven R. Schmid, "Manufacturing Engineering and Technology," Pearson, 2013.
2	George F. Schrader and Ahmad K. Elshennawy, "Fundamentals of Manufacturing," Society of Manufacturing Engineers, 2012.
3	Richard Crowson, "Introduction to Manufacturing Processes," McGraw-Hill Education, 2017.

Useful Links

1	https://archive.nptel.ac.in/courses/112/104/112104188/

2	https://www.youtube.com/watch?v=kC2SEiGaqoA
3	https://nptel.ac.in/courses/112104304

CO-PO Mapping For Mechanical Engineering Department															
	Programme Outcomes (PO)												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	
CO1	3				2					1		1	2		
CO2			2												
CO3					3					1					
The strength of mapping is to be written as 1,2,3; Where, 1:Low, 2:Medium, 3:High															

Assessment				
There are three components of lab assessment, LA1, LA2 and Lab ESE. IMP: Lab ESE is a separate head of passing.(min 40 %), LA1+LA2 should be min 40%				
Assessment	**Based on**	**Conducted by**	**Typical Schedule**	**Marks**
LA1	Lab activities, attendance, journal	Lab Course Faculty	During Week 1 to Week 8 Marks Submission at the end of Week 8	30
LA2	Lab activities, attendance, journal	Lab Course Faculty	During Week 9 to Week 16 Marks Submission at the end of Week 16	30
Lab ESE	Lab activities, journal/ performance	Lab Course Faculty and External Examiner as applicable	During Week 18 to Week 19 Marks Submission at the end of Week 19	40
Week 1 indicates starting week of a semester. Lab activities/Lab performance shall include performing experiments, mini-project, presentations, drawings, programming, and other suitable activities, as per the nature and requirement of the lab course. The experimental lab shall have typically 8-10 experiments and related activities if any.				

Walchand College of Engineering, Sangli

(Government Aided Autonomous Institute)

AY 2023-24

Course Information

Programme	B.Tech. All Branches
Class, Semester	First Year B. Tech. SEM-I & II
Course Code	7VS151
Course Name	Engineering Skills (Mechanical/Civil) Lab
Desired Requisites:	

Teaching Scheme		**Examination Scheme (Marks)**			
Practical	2Hrs/Week	**LA1**	**LA2**	**ESE**	**Total**
Interaction	-	30	30	40	100
		Credits: 1			

Course Objectives

1	To train the students to use different tools and equipments involved in the manufacturing processes
2	To develop the skills to handle the basic cutting tools and devices required for various manufacturing processes, interpret the given job drawing, select relevant fitting tools
3	To prepare the students to carry out the various operations to make a finished product
4	To prepare approximate Estimate of material requirement in constructed structure and to calculate FSI

Course Outcomes (CO) with Bloom's Taxonomy Level

At the end of the course, the students will be able to,

CO	**Course Outcome Statement/s**	**Bloom's Taxonomy Level**	**Bloom's Taxonomy Description**
CO1	Illustrate the simple mechanical systems, machines, equipment, the basic working of cutting tools for manufacturing.	II	Understanding
CO2	Use of Fitting tools, job holding devices, measuring tools	III	Apply
CO3	Defining the building line out and masonry construction.	II	Understanding
CO4	calculate the FSI and terminologies related to building plan.	III	Apply
CO5	Estimate the material requirement in constructed structure.	II	Apply
CO6	Sketch building plan.	II	Apply

List of Experiments / Lab Activities

List of Experiments [Mechanical]:

1. Introduction to **woodworking**,the hand tools required and machines:
   Perform Planing operation,Cutting by chisel to prepare small **wooden job** [Square joint type] (4 Hrs)
2. Introduction to **fitting shop** tools, equipment/machines:
   Job consisting of **male and female parts** viz.one with groove, another with matching projection,holes on both and their assembly, as per given job drawing.
   operations to be performed:Marking,Punching,Sawcutting,Drilling, Edge filing operations (6 Hrs.)
3. Introduction to **sheet metal work** : Job of small **sheet metal tray** as per given job drawing with following operations: Marking,Cutting,bending/folding (4 Hrs.)

List of Experiments [Civil]:

1. Establishing verticality right angle corner level difference in masonry construction (2 Hrs)
2. Line out building plan on site (2 Hrs)
3. Estimate quantities/ material (4Hrs)
   a) Brickwork
   b) Concrete component
   c) Flooring
4. Sketching of building plan and calculation of FSI (2Hrs)

Text Books [Mechanical]

1	Raghuwanshi B. S.,"A Course in Workshop Technology I",Dhanpat Rai Publications,10th Ed.,2009
2	S. K. Hajra Choudhury and A. K. HajraChoudhary,"Workshop Technology" – Vol I [Manufacturing Processes]",Media Promoters and Publishers Pvt. Ltd., 10th edition, reprint 2001
3	Bawa . H S . "Workshop Practice, " McGraw Hill Education, Noida, 2nd edition ,2009 ISBN-13: 978-0070671195
4	Gupta, J. K . ; Khurmi , "A Textbook of Manufacturing Process" (Workshop Tech.) R S S Chand and Co., New Delhi,2020, ISBN:81-219-3092-8
5	Singh Rajender, "Introduction to Basic Manufacturing Process and Workshop Technology ",New Age International, New Delhi; 2014, ISBN: 978-81-224-3070-7
References [Mechanical]	
1	W.A.J. Chapman, "Workshop Technology Volume I", CBS Publishing & Distributors, Delhi. [ISBN-13:9788123904016] 2001
2	Rao P.N., "Manufacturing Technology", Vol. I and Vol. II, Tata McGraw Hill House,2017
3	Gowri P. Hariharan and A. Suresh Babu, "Manufacturing Technology – I" Pearson Education, 2008
Text Books [Civil]	
1.	Hirasakar G. K., "Basic Civil Engineering", DhanpatRai publications, 1st Edition,2007
2.	Gole L.G., "Introduction to Civil Engineering", Mahu Publisher House, 4th Edition, 2005
3.	Bhavikatti S.S., "Basic Civil Engineering", New Age Publications, 2010
References [Civil]	
1	Duggal S.K., "Surveying (Vol I)", Tata McGraw Hill, 4th edition 2013
2	Bindra S.P., Arora S.P. , "Building Construction", Dhanpat Rai publication, 5th edition, 2012
Useful Links	
1	https://www.vlab.co.in/broad-area-mechanical-engineering
2	https://drive.google.com/file/d/1tp5yV2ghp_Slub58S7iKnvvJyoEwQVYq/view
3	https://www.youtube.com/@workshop.supdtjmdabir5653
4	https://www.youtube.com/watch?v=gPaBULgRRuM
5	https://www.youtube.com/watch?v=-f7tTNRH_04
6	https://www.youtube.com/watch?v=UD3q5R0N8U4
7	https://www.youtube.com/watch?v=uapzeNwKq4U
8	https://www.youtube.com/watch?v=jbRgJbIGAwc
9	https://www.youtube.com/watch?v=TeErxz59Sss
10	https://www.youtube.com/watch?v=F4SwbJ1euB8
11	https://www.youtube.com/watch?v=cuv-tP6JHEI
12	https://www.youtube.com/watch?v=vUIY_BiLyFI
13	https://www.youtube.com/watch?v=xMQOR6Jg3o4
14	https://www.youtube.com/watch?v=OdrBpPNJMaI
15	https://www.youtube.com/watch?v=uAIXHqOm0AM
16	https://www.youtube.com/watch?v=DzCBASUKpF4
17	https://www.youtube.com/watch?v=TQ_NeHenT9Y
18	https://www.youtube.com/watch?v=rkp2Uvpop-g
19	https://www.youtube.com/watch?v=iDJ_sMvXsYs
20	https://www.youtube.com/watch?v=xZgtyNdGHvs

CO-PO Mapping															
	Programme Outcomes (PO) Mechanical												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1				1											
CO2				1											
CO3					1										
	Programme Outcomes (PO) Civil												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1				1											
CO2				1											
CO3					1										
	Programme Outcomes (PO) Electrical												PSO		

	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1				1											
CO2				1											
CO3					1										
	Programme Outcomes (PO) Electronics												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1				1											
CO2				1											
CO3					1										
	Programme Outcomes (PO) Information Technology												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1				1											
CO2				1											
CO3					1										
	Programme Outcomes (PO) Computer Science and Engineering												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1				1											
CO2				1											
CO3					1										
The strength of mapping is to be written as 1,2,3; Where, 1:Low, 2:Medium, 3:High															

Assessment				
There are three components of lab assessment, LA1, LA2 and Lab ESE. IMP: Lab ESE is a separate head of passing. LA1, LA2 together is treated as In-Semester Evaluation.				
Assessment	**Based on**	**Conducted by**	**Typical Schedule (for 26-week Sem)**	**Marks**
LA1	Lab activities, attendance, journal	Lab Course Faculty	During Week 1 to Week 6 Marks Submission at the end of Week 6	30
LA2	Lab activities, attendance, journal	Lab Course Faculty	During Week 7 to Week 12 Marks Submission at the end of Week 12	30
Lab ESE	Lab activities, attendance, journal	Lab Course Faculty	During Week 15 to Week 18 Marks Submission at the end of Week 18	40
Week 1 indicates starting week of a semester. The typical schedule of lab assessments is shown, considering a 26-week semester. The actual schedule shall be as per academic calendar. Lab activities/Lab performance shall include performing experiments, mini-project, presentations, drawings, programming and other suitable activities, as per the nature and requirement of the lab course. The experimental lab shall have typically 8-10 experiments.				

Walchand College of Engineering, Sangli

(Government Aided Autonomous Institute)

AY 2023-24

Course Information

Programme	B.Tech. (Civil & Mechanical Engineering)
Class, Semester	First Year B. Tech., Sem I/ II
Course Code	7CH101
Course Name	Engineering Chemistry (Civil / Mechanical)
Desired Requisites:	Chemistry course at Secondary and Higher secondary level

Teaching Scheme		Examination Scheme (Marks)			
Lecture	2 Hrs/week	**MSE**	**ISE**	**ESE**	**Total**
Tutorial	0 Hrs/week	30	20	50	100
		Credits: 3			

Course Objectives

1	To make student familiar with engineering properties associated with different materials to use them successfully in practice.
2	To provide knowledge and significance of characterization and chemical analysis for using materials in different engineering applications.

Course Outcomes (CO) with Bloom's Taxonomy Level

At the end of the course, the students will be able to,

CO	Course Outcome Statement/s	Bloom's Taxonomy Level	Bloom's Taxonomy Description
CO1	Explain terms chemical analysis, thermal analysis, water parameters, Types of corrosion, Mechanism of Corrosion, setting and hardening of Portland cement and water's industrial applications.	II	Understanding
CO2	Draw schematic of water softeners, Thermo grams, Thermo equipment's, Glass electrode, GLC setup,	II	Understanding
CO3	Classify types of chemical analysis, hard water, Engineering materials, types of alloy and carbon steel. Chromatography.	II	Understanding
CO4	Calculate concentration of solutions, % of analyte gravimetrically, hardness of water, Calorific values, % weight loss TGA	III	Applying

Module	Module Contents	Hours
I	**Module 1. General principles of chemical Analysis Part A: Volumetry** Chemical analysis, Its types/ classification, Different ways to express concentration of solution & Numerical problems. Standards and its types, Definition of terms associated with titrimetry. Classification of titrimetry with application of type analysis, Numerical problems.	7
II	**Module 2. General principles of chemical Analysis Part B: Gravimetry & Instrument** Gravimetry and its requirements, applications and Numerical problems. pH metry, potentiometry, Single beam spectrophotometry w.r.t. Principle, Instrumentation, Calibration, Application Chromatography and its types & Introduction to GLC, Introduction for SEM, TEM,AFM and its applications. Advantages and Disadvantages of instrumental and non-instrumental methods.	6

(Dr. Dodla S. Rao) (A. A. Powar) (K. V. Madhale) (Mrs. V. B. Giryaonkar)

III	**Modules 3. Water Chemistry** - Natural sources of water, Impurities in natural water. Water quality parameters Hardness- Definition, Causes, Types, Expressing hardness, units to measure hardness, Numerical problems on hardness calculation, ill effects of hard water in steam generation, Alkalinity, Chloride , Dissolved oxygen(DO), Biological Oxygen Demand (BOD) and Chemical Oxygen Demand (COD) its significance. Ion exchange method of water softening.	7
IV	**Module 4 : Corrosion Science** Definition of corrosion, Types of corrosion, Dry & wet corrosion, Electrochemical & Galvanic series & its importance, Mechanism of Hydrogen evolution and Oxygen absorption corrosion, Factors influencing rate of corrosion, Various methods for protection from corrosion viz. Surface coatings(Electroplating, Galvanizing, Tinning) Cathodic and Anodic protection.	7
V	**Module 5. Thermal Analysis** Thermal analysis and its types, Thermal events, Thermal analysis methods Thermo gravimetric Analysis (TGA), Differential Thermal Analysis (DTA)and Differential Scanning Calorimetry (DSC) w.r.t. Principle, instrumentation, and applications, Interpretation of Thermogram. % weight loss TGA numericals	6
VI	**Module 6: Ceramic and Metallic materials** Engineering materials and its classification, Ceramics – definition, classification, properties, Portland cement – Chemical and compound composition, Mechanism of setting and hardening. Account of rapid setting, high alumina and high early strength cement by modifying compound composition. Alloy and purposes of alloying, Carbon Steel it's types Low, Medium, High, Brass it's general properties, Properties and uses of Cartridge, Admiralty, Muntz Metal , Leaded Duralumin, Bronzes general properties, Properties and uses of Phosphor Bronze, Aluminium Bronze, Gun Metal, Silicon Bronze .	6

	Textbooks
1	S.K. Singh, "Engineering Chemistry", New Age Publication, 3rd Edition , 2005.
2	Shasi Chawla, "Engineering Chemistry", Dhanpat Rai Publication, 3rd Edition , 2003.
3	Jain P.C. and Jain Monika, "Engineering Chemistry", Dhanpat Rai Publication, 16th Edition, 2013

	References
1	O G Palanna, "Engineering Chemistry" Tata McGraw Hill 2009.
2	Mendham, R.C. Denney, J.D. Barnes, M.J.K Thomas, "Quantitative Chemical analysis", Vogel's Pearson Education, 6th Edition , 2008.
3	S.S Dara, "Engineering Chemistry" S. Chand and Company 2008.
4	Askeland and Phule , "The Science and Engineering of Materials" Thomson Publication 4th Edition ,2003
5	Douglas A. Skoog, E James Holler, Stanely R Crouch, " Principles of Instrumental Analysis", Thomson publication, 2007, 6th Edition

	Useful Links
1	https://edu.rsc.org/resources
2	A free resource for Chemistry teachers and students of all levels, including higher education, hosted by Royal Society of Chemistry.
3	https://www.digimat.in/nptel/courses/video/122106028/L01.html
4	https://onlinecourses.nptel.ac.in/noc21_cy49/preview

CO-PO Mapping														
	Programme Outcomes (PO)												PSO	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
CO1	3													
CO2	3													
CO3	3													
CO4	3													
The strength of mapping is to be written as 1: Low, 2: Medium, 3: High Each CO of the course must map to at least one PO.														

Assessment
The assessment is based on MSE, ISE and ESE. MSE shall be typically on modules 1 to 3. ISE shall be taken throughout the semester in the form of teacher's assessment. Mode of assessment can be field visit, assignments, surprise or declared test etc. ESE shall be on all modules with around 40% weightage on modules 1 to 3 and 60% weightage on modules 4 to 6. For passing a theory course, Min. 40% marks in (MSE+ISE+ESE) are needed and Min. 40% marks in ESE are needed. (ESE shall be a separate head of passing)

(Dr. Dodla S. Rao)

A A Powar

(K. V. Mashale)

(Prof. V. B. Giriyaonkar)